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ABSTRACT

This collection of papers on the youth employment problem consists of 15 papers that cover the dimensions, causes, and consequences of youth unemployment and that also focus on problems in measuring the extent of the problem, the dynamic aspects of youth labor force participation, and problems associated with adequately assessing the consequences of youth labor market experiences. Included among those topics discussed are teenage unemployment, the youth labor market problem in the United States, and the relationship of labor market turnover to youth unemployment. The reasons for differences among rates of youth labor force activity across surveys are analyzed. Also examined are time series in youth joblessness, economic determinants of geographics and individual variation in the labor market position of youth, and the dynamics of youth unemployment. The effects of family, dead-end jobs, minimum wage and job turnover, and high school preparation and early labor force experience on youth employment are described. Compared next is the extent of youth unemployment in Britain and the United States. The effects of teenage unemployment on the individual and the employment and wage consequences of teenage women's nonemployment are also investigated. (MN)

YOUTH KNOWLEDGE DEVELOPMENT REPORT

RESEARCH ON YOUTH EMPLOYMENT AND EMPLOYABILITY DEVELOPMENT

The Youth Employment Problem—Dimensions, Causes and Consequences

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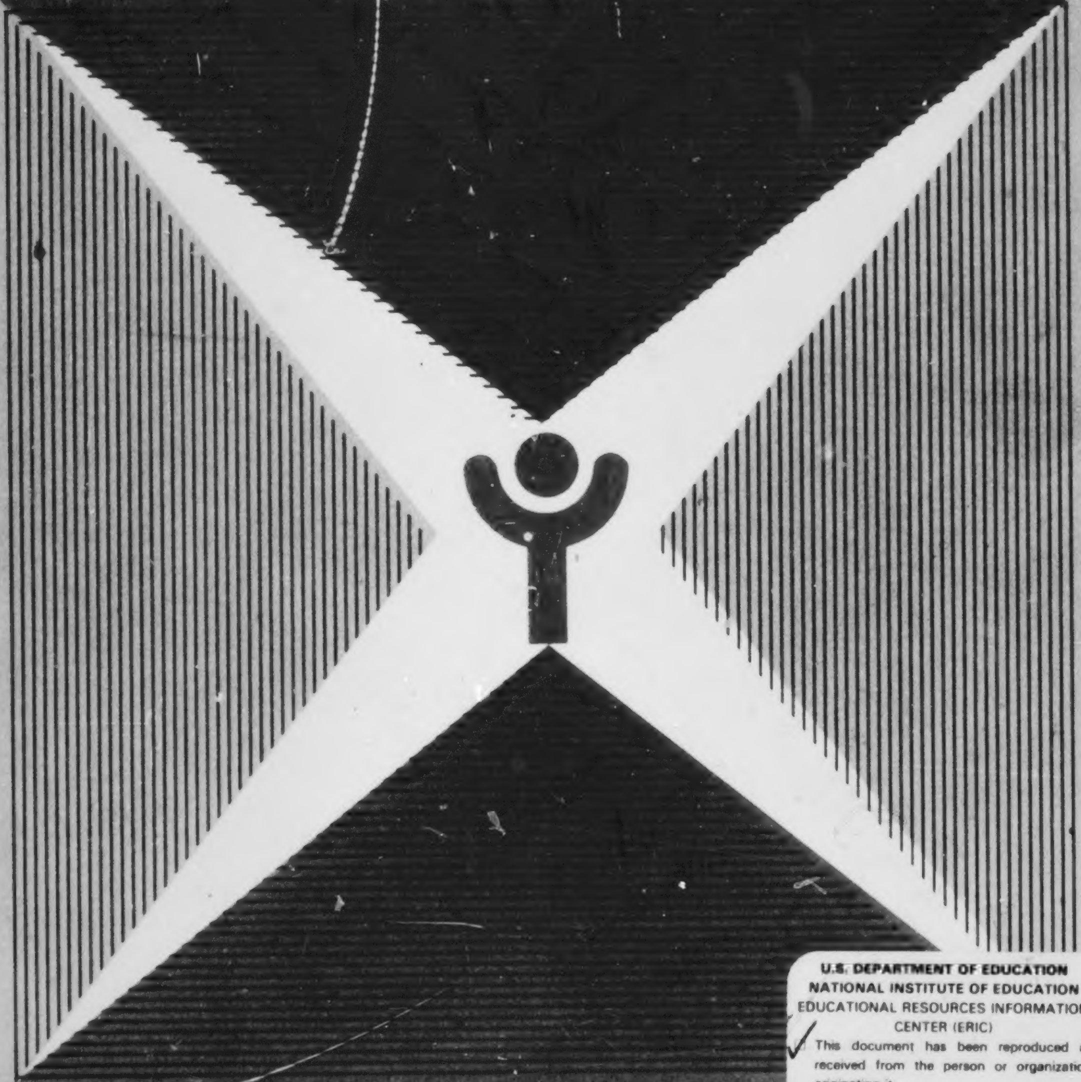

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YOUTH KNOWLEDGE DEVELOPMENT REPORT 2.9

THE YOUTH EMPLOYMENT PROBLEM--DIMENSIONS, CAUSES AND CONSEQUENCES

National Bureau of Economic Research

May 1980

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OVERVIEW

There is, by now, a small library of analyses of the dimensions, causes and consequences of youth employment problems. This set of papers, developed with funding from the Office of Youth Pograms by the National Bureau of Economic Research, covers much familiar territory but also provides fresh perspective on three key dimensions:

First, the measurement uncertainties are clearly identified. It is fairly well proven that the official employment and unemployment statistics, frequently relying on secondhand reporting about the status of youth, yield a much different picture than direct interviews with youth; for teenagers, students and nonwhites, the direct interviews tend to yield higher rates of employment and unemployment. Moreover, the definitions themselves are suspect. The analyses document the similarities in behavior between youth counted as out of the labor force and those counted as unemployed, as well as the statistical relationship between labor force participation and job availability. On the other hand, if education is included as an activity on a par with work--and it is clearly an option--then the trends and current conditions do not look so serious.

Second, there is penetrating analysis of the dynamic aspects of youth labor force participation and the factors which affect transition probabilities. The picture is very complex but tends to suggest that for out-of-school youth, job-hopping or voluntary unemployment is not significantly different from the patterns of adults who are in the secondary labor market. Certainly differences in volitional behavior do not explain the significant varied differentials which exist.

Third, the assessment of the consequences of youth labor market experiences go further than previous analyses in controlling for the characteristics of individuals which may be correlated with employment in the teen years and subsequently, so that the impact estimates are more realistic. Work during the school years significantly increases the probability of employment in the immediate post-school period. Joblessness in the immediate post-school period does not leave "scars" as measured by enduring unemployment but does leave "scars" as measured by lower wages related to the later start in the labor market.

The specific findings are well summarized in the opening paper. Perhaps of most importance, however, is what is implicit rather than explicit. Underlying the complex analyses and the carefully reasoned arguments, there are a range of value judgments which usually emerge when moving from findings to conclusions. The most difficult task of all is to determine what is policy significant rather than statistically significant--what is "new," "surprising," "large" or "small." For instance, some of the papers dismiss the importance of the job needs of in-school youth, yet others document that work during the school years is highly correlated with earnings and emloyment in the post-school period. Those studies focusing on high school graduates and comparing the composition of youth unemployment to adult unemployment find the youth employment problem to be less serious than those focusing on racial problems or long-term and recurring spells of nonemployment. The "big" picture is that the labor market functions reasonably and that the problems are transitional for most youth. The more focused and less sanguine picture is that the prospects for certain significant segments are abhorrent and cannot be explained away. Most spells of youth unemployment are quite short, but most are also bracketed by labor force nonparticipation and most of the aggregate weeks of unemployment are experienced by a minority of the unemployed. Whether concentration makes the problem more or less serious is a matter of debate. Some analysts conclude from the volatility of labor force participation that youth do not want to work or have tentative attachments; others conclude from the cross-sectional and time series correlations between labor market tightness and youth employment that job deficits are significant and the real problem. Post school employment rates are not correlated with future unemployment for males, but are correlated with future earnings; this may be variously interpreted as minimizing the "scarring" effects or documenting their importance.

Another implicit issue is the limitation in analytic methods and the diminishing returns from increasingly sophisticated analysis. One example is in the assessment of the consequences of youth unemployment. The methodologies used to adjust for differences in individuals which are not captured by demographic variables available for regression analysis--differences which persist from period to period and have an impact on future choice--are rather arcane. A basic shortcoming is that the status variables run over time periods, producing spurious correlations. For instance, those youth out of the labor force in year one will likely be out in year two simply because some are youth in this status in the last week of the first year. Another example is that what may be considered a characteristic of individuals is, in fact, enforced by realities, for instance, a lagging work ethic in response to limited or secondary labor market opportunities. Where the employment experience affects other variables such as family status, then regression or clustering techniques correcting for differences in these variables leaves questions. In other words, first order regression analyses find impacts of work on future earnings and employment. Second order or more complex analyses reduce these impacts by compensating for unreported differences between individuals. The second cut is subject to many theoretical uncertainties and with different assumptions could range from zero to the upper bound of first order correlations. Third order analysis will adjust for uncertainties in the techniques of the second order. Unfortunately, the dependability of the data--given the massive problems which have been noted--do not support these ever more sophisticated cuts at the information. The work is surely worth doing to measure inputs, but the information yield diminishes. There are similar problems in dealing with time series relationships, with residual measures of discrimination and with interaction of key variables. The most sophisticated techniques should be used if they do not exceed the power of the data base and as long as they do not obfuscate. These papers clearly seek to explain assumptions and make reasonable interpretations, but there is some question about "what it all means" when interpreting the sum of all these assumptions and multi-faceted findings.

This study is one of "knowledge development" activities mounted in conjunction with research, evaluation and development activities funded under the Youth Employment and Demonstration Projects Act of 1977. The knowledge development effort will result in literally thousands of written products. Each activity has been structured from the outset so that it is self-standing but also interrelated with a host of other activities. The framework is presented in A Knowledge Development Plan for the Youth Employment and Demonstration Projects Act of 1977, A Knowledge Development Plan for the Youth Initiatives Fiscal 1979 and Completing the Youth Agenda: A Plan for Knowledge Development, Dissemination and Application for Fiscal 1980.

Information is available or will be coming available from these various knowledge development efforts to help resolve an almost limitless array of issues. However, policy and practical application will usually require integration and synthesis from a wide range of products, which, in turn, depend on knowledge and availability of these products. A major shortcoming of past research, evaluation and demonstration activities has been the failure to organize and disseminate the products adequately to assure the full exploitation of the findings. The magnitude and structure of the youth knowledge development effort puts a premium on structured analysis and wide dissemination.

As part of its knowledge development mandate, therefore, the Office of Youth Programs of the Department of Labor will organize, publish and disseminate the written products of all major research, evaluation and demonstration activities supported directly by or mounted in conjunction with OYP knowledge development efforts. Some of the same products may also be published and disseminated through other channels, but they will be included in the structured series of Youth Knowledge Development Reports in order to facilitate access and integration.

The Youth Knowledge Development Reports, of which this is one, are divided into twelve broad categories:

1. Knowledge Development Framework: The products in this category are concerned with the structure of knowledge development activities, the assessment methodologies which are employed, the measurement instruments and their validation, the translation of knowledge into policy, and the strategy for dissemination of findings.

2. Research on Youth Employment and Employability Development: The products in this category represent analyses of existing data, presentation of findings from new data sources, special studies of dimensions of youth labor market problems, and policy issue assessments.

3. Program Evaluations: The products in this category include impact, process and benefit-cost evaluations of youth programs including the Summer Youth Employment Program, Job Corps, the Young Adult Conservation Corps, Youth Employment and Training Programs, Youth Community Conservation and Improvement Projects, and the Targeted Jobs Tax Credit.

4. Service and Participant Mix: The evaluations and demonstrations summarized in this category concern the matching of different types of youth with different service combinations. This involves experiments with work vs. work plus remediation vs. straight remediation as treatment options. It also includes attempts to mix disadvantaged and more affluent participants, as well as youth with older workers.

5. Education and Training Approaches: The products in this category present the findings of structured experiments to test the impact and effectiveness of various education and vocational training approaches including specific education methodologies for the disadvantaged, alternative education approaches and advanced career training.

6. Pre-Employment and Transition Services: The products in this category present the findings of structured experiments to test the impact and effectiveness of school-to-work transition activities, vocational exploration, job-search assistance and other efforts to better prepare youth for labor market success.

7. Youth Work Experience: The products in this category address the organization of work activities, their output, productive roles for youth, and the impacts of various employment approaches.

8. Implementation Issues: This category includes cross-cutting analyses of the practical lessons concerning "how-to-do-it." Issues such as learning curves, replication processes and programmatic "batting averages" will be addressed under this category, as well as the comparative advantages of alternative delivery agents.

9. Design and Organizational Alternatives: The products in this category represent assessments of demonstrations of alternative program and delivery arrangements such as consolidation, year-round preparation for summer programs, the use of incentives, and multi-year tracking of individuals.

10. Special Needs Groups: The products in this category present findings on the special problems of and the programmatic adaptations needed for significant segments including minorities, young mothers, troubled youth, Indochinese refugees, and the handicapped.

11. Innovative Approaches: The products in this category present the findings of those activities designed to explore new approaches. The subjects covered include the Youth Incentive Entitlement Pilot Projects, private sector initiatives, the national youth service experiment, and energy initiatives in weatherization, low-head hydroelectric dam restoration, windpower, and the like.

12. Institutional Linkages: The products in this category include studies of institutional arrangements and linkages as well as assessments of demonstration activities to encourage such linkages with education, volunteer groups, drug abuse, and other youth serving agencies.

In each of these knowledge development categories, there will be a range of discrete demonstration, research and evaluation activities focused on different policy, program and analytical issues. In turn, each discrete knowledge development project may have a series of written products addressed to different dimensions of the issue. For instance, all experimental demonstration projects have both process and impact evaluations, frequently undertaken by different evaluation agents. Findings will be published as they become available so that there will usually be a series of reports as evidence accumulates. To organize these products, each publication is classified in one of the twelve broad knowledge development categories, described in terms of the more specific issue, activity or cluster of activities to which it is addressed, with an identifier of the product and what it represents relative to other products in the demonstrations. Hence, the multiple products under a knowledge development activity are closely interrelated and the activites in each broad cluster have significant interconnections.

This volume should be assessed in conjunction with A Review of Youth Employment Problems, Programs and Policies, Between Two Worlds--Youth Transition from School to Work and Youth Unemployment--Its Measurement and Meaning.

Robert Taggart
Administrator
Office of Youth Programs

CONTENTS

Page

Overview i

The Youth Employment Problem:
Its Dimensions, Causes and
Consequences
Richard B. Freeman and David A. Wise............ 1

Teenage Unemployment: What is the Problem?
Martin Feldstein and David Ellwood................ 29

The Youth Labor Market Problem in the
United States: An Overview
Richard B. Freeman and J.L. Medoff.............. 58

Labor Turnover and Youth Unemployment
Linda S. Leighton and Jacob Mincer................ 93

Why Does the Rate of Youth Labor Force Activity
Differ Across Surveys?
Richard B. Freeman and J.L. Medoff............. 159

Time Series Changes in Youth Joblessness
Michael L. Wachter and Choongsoo Kim............. 200

Economic Determinants of Geographics
and Individual Variation in the
Labor Market Position of Young Persons
Richard B. Freeman............................. 259

The Dynamics of Youth Unemployment
Kim B. Clark and Lawrence H. Summers............. 298

Family Effects in Youth Employment
Albert Rees and Wayne Gray....................... 343

Dead-End Jobs and Youth Unemployment
Charles Brown.................................... 358

Youth Unemployment in Britain and the
U.S. Compared
Richard Layard................................. 387

The Minimum Wage and Job Turnover
in Markets for Young Workers
Robert E. Hall................................. 451

High School Preparation and Early
Labor Force Experience
Robert H. Meyer and David A. Wise.............. 477

Page

Teenage Unemployment: Permanent Scars or Temporary Blemishes
David Ellwood.................................. 584

The Employment and Wage Consequences of Teenage Women's Nonemployment
Mary Corcoran.................................. 649

THE YOUTH EMPLOYMENT PROBLEM:
ITS DIMENSIONS, CAUSES, AND CONSEQUENCES

by

Richard B. Freeman and David A. Wise

Youth and young adults have traditionally worked less than older persons. While some youth work less than adults because they are devoting a major portion of their time to schooling or to leisure activities, others work less because they have great difficulty obtaining jobs or because they are in the midst of switching their primary activity from schooling to employment, a process that involves considerable searching and job changing before settling into more or less permanent employment.

In recent years, as large numbers of youths have entered the job market, and because some groups of young persons have lower employment rates than comparable youth of the past, there has been rising concern about the operation of the youth labor market. Youth unemployment has become a major issue, as evidenced by Congressional legislation such as the Youth Employment and Demonstration Projects Act of 1977.

Under the auspices of the National Bureau of Economic Research (NBER), for the past year economists from several universities have been engaged in extensive investigation of the nature of youth employment, the causes of changes in youth employment rates over time, the causes of individual differences in employment experiences, and the consequences of youth unemployment. This paper represents a distillation of the findings of that work. It summarizes briefly (pp. 2-6) the principal results of the NBER analysis and then describes the nature of these results in greater detail.

Dimensions of the Youth Employment Problem

1. One of the most important lessons from our analysis is that standard published statistics may not adequately measure the dimensions of youth employment and joblessness. First, different sources of employment information lead to widely differing estimates of the number of employed youth. The Current Population Survey (CPS), which provides the official government statistics, reports a smaller number of youth employed than do other government-financed surveys

Second, the traditional distinction between being unemployed (out of work and looking for a job) and being out of the labor force (out of work and not looking for a job) appears less clear for young persons than for older workers. Many youth are on the borderline between seeking work and not seeking work, and switch from one group to the other frequently. Some youth who are out of the labor force may in fact desire to work but have simply given up looking. On the other hand, some youth who are classified as unemployed may not be seeking work as actively as unemployed adults. In addition, many youth who are classified as unemployed are also in school full time, an activity that many would consider as productive as work. While for all age groups, the difference between unemployment and being out of the labor force is ambiguous, the ambiguity is especially great for youth.

2. Constant references to the youth employment problem, as if all or the majority of young persons have difficulty obtaining jobs, appear to misinterpret the nature of the difficulty. Youth joblessness is in fact concentrated, by and large, among a small group who lack work for extended periods of time. Over half of the male teenage unemployment is, for example, among those who are out of work for over six months, a group constituting less than 10 percent of the youth labor force and only seven percent of the youth population. The concentration of joblessness among a small group means that lack of employment is a major problem for that group, but also that the bulk of youth have little difficulty obtaining work.

3. The relatively small group of youth who are chronically without work have distinct characteristics. They are disproportionately black; disproportionately high school dropouts, and disproportionately residents of poverty areas. Over time, the percentage of black youth with jobs has fallen while the proportion of white youth with jobs has not, implying a deterioration in the employment chances of black youth. Despite the extremely high rate of unemployment among black youth, though, the fact is that since there are many more whites than blacks in the population, most unemployment in even this chronic group is accounted for by whites.

While the employment rate of black youth has fallen sharply over the past decade, the wages of young blacks have risen relative to those of white youth. By the mid 1970's the wage rates of black and white youth with comparable levels of education were approximately equal.

The Causes of Youth Employment Problems

4. One of the most important determinants of youth employment is the strength of the economy as a whole. When the aggregate level of economic activity and the level of adult employment is high, youth employment is also high. Quantitatively, the employment of youth appears to be one of the most highly sensitive variables in the labor market, rising substantially during boom periods and falling substantially during less active periods.

Another oft-mentioned determinant of youth employment is the proportion of youth in the population. According to our analysis, however, while the increase in the relative number of young people in recent yeras has adversely affected youth employment, its primary impact has been to depress youth wages relative to adult wages.

A third important determinant of youth employment is the minimum wage; our evidence confirms previous findings that by making youth labor more expensive, increases in the minimum wage reduce youth employment.

5. At any given time, youth with certain background character-

istics tend to have lower employment rates than youth with other characteristics. Some of the characteristics associated with lower employment appear to be unrelated to wages. Youth from poor families frequently tend to be employed less often than youngsters from wealthier families, although once employed, both groups earn about the same wages. As noted earlier, blacks are employed less often than whites, but earn about the same wages when employed. The sizeable increase in black youth wage rates may have contributed to the relative deterioration in employment of black youth.

6. Some forms of preparation during high school are related to subsequent labor market experiences of youth while others are not. Vocational training in high school shows little, if any, relationship to labor market success, even among youth who obtain no further education after high school. Academic performance in high school, on the other hand, is positively related to both employment and wages after graduation and entry into the labor force. And most important and possibly surprising, youth who work in high school work much longer per year when they enter the labor force full time than teenagers who do not work while in high school, and they earn more per hour as well.

The Consequences of Youth Employment and Unemployment

7. Much of the recent discussion about youth unemployment is focused on the fear that lack of work in one's youth will contribute substantially to unemployment later in life. This fear appears to be

greatly exaggerated. We have found that unemployment immediately following school completion has virtually no effect on employment three or four years later. Indeed, initial wage rates have almost no effect on later wage rates. However, early unemployment has a sizeable negative effect on later wage rates.

8. While the precise links have yet to be established, the changing employment situation of young black persons has been associated with other widespread social developments: increases in youth crime, drug use, violence in schools, and youth suicide, suggesting that the consequences and correlates of the problem go beyond standard economic issues. The finding that youth unemployment is concentrated among a small group of youth in itself suggests that this group may also have other social problems.

In short, the NBER study has found that many commonly-held views about the youth employment problems are erroneous and that many critical aspects of the problems have been inadequately understood: youth unemployment, rather than being widespread among a large proprotion of youth, is in fact concentrated among a small group of youngsters; the nature of youth employment and unemployment differs substantially from that of adult employment and unemployment; and youth unemployment generally does not have the major long-term consequences on later employment that some have feared though it does affect later wages.

THE NATURE OF THE YOUTH EMPLOYMENT PROBLEM

A few basic statistics will motivate and provide background for our subsequent discussion. Employment and unemployment rates for selected years by race, sex, and age are shown in the tabulation below.[1]

EMPLOYMENT AND UNEMPLOYMENT RATES 1954-1977

	WHITE				BLACK AND OTHER			
	1954	1964	1969	1977	1954	1964	1969	1977
Men								
Percent Employed								
Age: 16-17	40.6	36.5	42.7	44.3	40.4	27.6	28.4	18.9
18-19	61.3	57.7	61.8	65.2	66.5	51.8	51.1	36.9
20-24	77.9	79.3	78.8	80.5	75.9	78.1	77.3	61.2
25-54	93.8	94.4	95.1	91.3	86.4	87.8	89.7	81.7
Percent of Labor Force Unemployed								
Age: 16-17	14.0	16.1	12.5	17.6	13.4	25.9	24.7	38.7
18-19	13.0	13.4	7.9	13.0	14.7	23.1	19.0	36.1
20-24	9.8	7.4	4.6	9.3	16.9	12.6	8.4	21.7
25-54	3.9	2.8	1.5	3.9	9.5	6.6	2.8	7.8
Women								
Percent Employed								
Age: 16-17	25.8	25.3	30.3	37.5	19.8	12.5	16.9	12.5
18-19	47.2	43.0	49.2	54.3	29.9	32.9	33.9	28.0
20-24	41.6	45.3	53.3	61.4	43.1	43.7	51.5	45.4
25-54	40.1	41.0	46.2	54.1	49.0	52.7	56.3	57.4
Percent of Labor Force Unemployed								
Age: 16-17	12.0	17.1	13.8	18.2	19.1	36.5	31.2	44.7
18-19	9.4	13.2	10.0	14.2	21.6	29.2	25.7	37.4
20-24	6.4	7.1	5.5	9.3	13.2	18.3	12.0	23.6
25-54	5.0	4.3	3.2	5.8	8.3	8.4	5.0	9.8

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[1] Freeman and Medoff (b).

These data show divergent levels and trends in the percentages of youth with jobs and the percentage unemployed; they describe the primary characteristics of the youth labor market.

Although youth unemployment is sometimes perceived and portrayed as a crisis of youth in general, these data do not support this interpretation. The employment rate of white male youth has changed only modestly in the past two decades; indeed the trend has been upward since the mid 1960's. The percent of white females employed has also risen substantially, even in the 1970's.

On the other hand, since 1954, the percent of black youth with jobs has fallen dramatically and there has been a correspondingly large increase in the black unemployment rate. This disturbing trend is even more troublesome in light of the fact that it is a relatively recent one. In 1954, approximately equal percentages of black and white youth were employed. Since that time, unemployment rates for black youth have risen and their employment position has deteriorated greatly. As can be seen in the preceding figures, the unemployed proportion of black youth has increased relative to black adults as well as relative to white youth. (In 1954, the unemployment rate of black youth was about 1.5 times the rate for black adults; by 1977, the youth rate was almost 4 times the adult rate).

Thus, to the extent that trends in the data signify a deterioration in the employment of youth, that deterioration is concentrated among black youngsters. Nonetheless, because a much greater proportion of the population is white, the vast majority of unemployed youth are white.

What the numbers in the tables above do not reveal is that almost half of the teenagers classified as unemployed are also in school. The unemployment of a young person in school, most would agree, represents less loss to society than that of an adult seeking full time work.

The Bureau of Labor Statistics defines unemployment as the ratio of persons looking for work to the number employed plus the number looking. According to this (BLS) definition, 18 percent of male teenagers, aged 16 to 19, were unemployed in October 1976. Since most full time students are not included in the youth labor force, however, this figure overstates the fraction of young persons who are ready to work but have no productive way to spend their time. Just 4.9 percent of teenagers are both unemployed and not in school. On the other hand, the unemployment data ignore youth who are not in the labor force. In October 1976, 9 percent of male teenagers, 16 to 19 years old, were either unemployed or out of the labor force and not in school. Moreover, only 70 percent of the out-of-school teenagers (many of whom were high school dropouts) held jobs, according to the Current Population Survey data.[1]

Whichever groups are considered, unemployment is concentrated among those with the lowest levels of education. Among out-of-school teenagers, for example, persons with less than 12 years of school account for 58 percent of the unemployed. Unemployment rates are much higher among high school dropouts than among high school graduates. Moreover, unemployment is also concentrated among relatively few persons; those unemployed for very long periods. If we add up all periods of unemployment for male teenagers, for example, we find that 54 percent of the total is composed of persons who are unemployed for more than six months of the year. Even more striking, 10 percent of all teenagers account for more than half of total teenage unemployment.[1] The majority of young persons move in and out of the labor force and obtain jobs with ease; many youth either experience no unemployment at all between transitions or are unemployed only for very short spells. However, the concentration of unemployment among a small fraction of youth has presumably higher social costs than if unemployment were evenly distributed among all youth.

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[1] Feldstein and Ellwood, based on data from October, 1976 (Current Population Survey). Wachter and Kim give comparable figures using annual averages, including summer months, for 1978.

In short, the data suggest that most teenagers do not have substantial employment difficulties, but that for a minority of youth, there are long periods without work that constitute severe problems. This group is composed in large part of high school dropouts and contains black youth in numbers disproportionate to their representation in the population.

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[1] Feldstein and Ellwood; Clark and Summers.

It is commonly believed that young persons have much more difficulty in finding jobs than their adult counterparts. Measured by the lengths of spells of unemployment, the evidence does not support this view. The average duration of periods of unemployment for teenagers is about the same as the average for adults.[1] However, many spells of teenage unemployment end not when a job is found but when the young person drops out of the labor force. Teenagers average as much as five months between loss of a job and attainment of a new job.[2] (The volatility of the youth labor force, with persons frequently entering and leaving the officially measured labor force, raises questions about the adequacy of the data in distinguishing between the two states.)

Unemployment rates can be decomposed into two components: the rate at which persons change jobs or switch from out of the labor force into the labor force, multiplied by the rate at which the changers or switchers are unemployed. Analysis of these two components of unemployment shows that young persons are unemployed more than adults because they change jobs or situations more often than adults, not because they have a greater chance of unemployment given a change in status.

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[1] Mincer and Leighton find duration to be longer for adults than young persons in their analysis.

[2] Clark and Summers.

About one fourth of young men, aged 18 to 24, change jobs in a year, compared to less than one tenth of men aged 35 to 54. The differential proportion of job changers by age is itself largely attributable, according to Mincer and Leighton's calculations, to differences in seniority by age. Low-seniority workers, of necessity primarily young workers, change jobs frequently while high-seniority workers, of necessity primarily older workers, change less frequently and are as a result less likely to be unemployed. One of the key factors behind the high rate of youth joblessness is the high mobility and short job tenure of the young.[1]

Finally, we emphasize that the interpretation of all these data is complicated by uncertainty about the accuracy of their magnitudes. Recent large scale surveys that interview young persons themselves, rather than resident adults in a household, as in common in the widely used Current Population Survey, reveal higher rates of employment and different rates of unemployment than the official government statistics.

For example, for October 1972, employment rates for out-of-school male high school graduates, based on the National Center for Educational Statistics study of the High School Class of 1972, were 88% for whites and 78% for blacks.[2] The comparable Current Popula-

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1. Mincer and Leighton.

2. Meyer and Wise.

tion Survey data, the basis for official Bureau of Labor statistics numbers) implied substantially lower unemployment rates of 82% and 68% respectively. Similar differences arise in comparing the Current Population Survey rates with those based on the National Longitudinal Survey of Young Men. A large portion of the difference among the various rates can be attributed to who answers the survey questions in each case. Youth report more employment activity for themselves than is reported by the household member most likely to respond to government population surveys, the youth's mother. The differences in reports are larger for in-school youths with full time jobs.[1] It is important to remember that until the discrepancy in survey results is completely resolved and the 'correct' rate of youth employment determined, there will be ambiguity about the causes and consequences of the problem.

THE CONSEQUENCES: MARKET DETERMINANTS OF YOUTH EMPLOYMENT

Whether a youth is employed or not depends partly on the strength of the economy and on broad demographic conditions, and partly on individual characteristics of the youths themselves. The aggregate determinants are those that influence the average level of youth employment at a given time; the individual influences are those that determine differences among individuals at a given time. We shall discuss the broader influences on the average youth employment rate in this section, and individual differences in the next section.

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[1] Freeman and Medoff.

The most important aggregate determinant is the level of economic activity. There is strong eivdence that when the economy is strong, youth as well as adult workers are better off. A widely used indicator of the level of aggregate economic activity is the unemployment rate for adult males. Young persons living in areas where the local unemployment rate is high have more spells of unemployment than comparable youth in areas with strong economies.[1]

Analysis of differences among metropolitan areas, based on 1970 Census data, indicates that an increase in the adult male unemployment rates is associated with disproportionately large decreases in the proportion of youth who are employed. When the adult unemployment rate rises by one percentage point, the proportion of youth who are employed drops by the following percentage amounts:[2]

Aged:	All Young Men	Out-of-School Young Men
16 to 17	5%	5%
18 to 19	2%	3%
20 to 24	3%	3%

Evidence based on changes in adult unemployment over time confirms these findings. The time series data show that a one percentage point increase in the adult male unemployment rate is associated with a five percent decrease in the proportion of young men aged 16 to 19 who are employed.[1] Thus youth employment is highly sensitive to cyclical movements in the economy.

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[1] Mincer and Leighton.

[2] Freeman.

A second indicator of aggregate economic activity, the growth rate of personal income, also shows a substantial positive relationship to youth employment, according to our comparative analysis of metropolitan areas. If these indicators reflect aggregate demand, then demand forces have a substantial effect on youth employment.

Two other measures of aggregate economic conditions are also strongly related to youth employment. One is the "industrial mix" in the area where the young person lives, and the other is the average income level in the area. Based on comparisons across metropolitan areas, youth employment is higher in those areas with a large number of industries that traditionally employ many young workers. Some of these industries have large numbers of jobs that do not require extensive training; other industries may simply have developed production processes, and organized their work forces, in such a way that large numbers of young persons are accommodated. The "industrial mix" has an approximately equal effect on the employment of teenagers aged 16 to 19 as the effect of aggregate economic activity (as measured by the adult unemployment rate) but has smaller effects on those aged 20 to 24.[1]

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[1] Clark and Summers. A comparable estimate for non-whites in this age group is over 6 percent. Estimates obtained from a separate time series analysis are also consistent with this general order of magnitude (Wachter and Kim).

In addition, the extent of poverty in an area affects the employment chances of youth. Those areas with greater proportions of families living in poverty, and those youths living in officially designated poverty areas, tend to have lower rates of youth employment.[2] This is true even among areas with similar levels of adult unemployment, personal income growth rates, and industrial mix. Thus some characteristics of youth, or the demand for young workers in poor areas, are not captured by these other geographic characteristics.

Another oft-mentioned aggregate determinant of the percent of youth who are employed is the proportion of the total population who are young. Over the past decade and a half, this proportion has increased dramatically. It is argued that production technologies and institutional arrangements may make the economy slow to adapt to large changes in the relative numbers of younger versus older workers, thereby increasing unemployment and reducing the fraction of youths who work.

Our evidence suggests that while there may be some such effects, especially for 16 to 17 year olds, the large increase in the number of the youths relative to adults in the labor force has affected wage rates more than employment. The fact that during the period of rapid increase in the youth proportion of the population the fraction of youth employed did not fall (see p. 7) casts doubt on the importance of the number of young persons as a major determinant of their employment.

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[1] Freeman.

[2] Rees and Gray; Freeman.

The large increases in the youth labor force in the summer months without a corresponding increase in youth unemployment also brings into question the effect of the proportion of youth in the population on their employment rate. During the summer months, the labor market absorbs large numbers of teenagers. Although teenage labor force participation has been almost 40 percent higher in July than the annual average, in July the teenage unemployment rate has been somewhat lower than the annual average.[1]

Evidence from geographic areas with different fractions of young persons, however, suggests that a one percentage increase in the proportion of the population who are young may lead to a noticeable reduction in the employment rate of 16 to 17 year olds, but not those aged 18 to 19, or those aged 20 to 24. Additional evidence based on movements over time in the employment of youth, suggests that increases in the relative number of youth are, in general, associated with declines in the employment ratio of most youth groups,[2] though not by enough to dominate the other factors contributing to youth employment.

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1. Clark and Summers.

2. Wachter and Kim.

Perhaps the greatest effect of the increasing proportions of youth in the population has been a decrease in youth wages relative to adult wages, rather than a decrease in youth employment. The earnings of black and white male youth, as a percent of earnings of adult males, are shown in the tabulation below for 1967 and 1977 and for selected age groups.[1]

	White		Black and Other	
Age	1967	1977	1967	1977
18	54	49	44	44
20	66	58	63	52
22	79	63	59	54
24	87	75	60	63

The earnings of young white men in all age groups declined rather dramatically relative to adult wages between 1967 and 1977. On the other hand, the earnings of black youth have not changed much, on average, relative to adult earnings. Thus, the market adjustment to larger numbers of youth has been reflected to some extent in a relative decline in youth wages. Indeed, for white youth, wages may have been the primary equilibrating mechanism, allowing the employment rate to be maintained in the face of large increases in the relative number of youth in the population. Traditional supply and demand analysis suggests that whenever the supply of any group of workers increases relative to the demand for them, the larger numbers will be employed only at a lower wage rate. In contrast to the decline in the white youth wage rates relative to adult wages, the wages of black youth--both male and female--rose relative to the wages of white youth. At the same time, black youth were finding it increasingly difficult to find jobs. It is likely that the change in the relative wages of the two groups contributed to the deterioration in black versus white employment.

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[1] Wachter and Kim.

There is also a wide body of evidence showing that the employment of both white and black youth is handicapped by the minimum wage, presumably because the minimum wage is higher than employers are willing to pay some youth. Since the number of young persons looking for jobs can change when the minimum wage changes, the minimum wage has a more systematic effect on employment than on unemployment of the young. Some results suggest larger effects on employment for 16-17 year olds, and for black youth in general, than for other groups.[1] Both the evidence on the relationship between youth employment and youth wage rates and the evidence on the effect of the minimum wage are consistent with evidence from the United Kingdom where youth employment appears to be quite sensitive to the level of youth wages.[2] The downward trend in youth wages relative to adult wages in the U.S., may however, have been a more important determinant of youth employment in the 1970's than changes in the legal minimum. In addition, although most discussions of the

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1. Wachter and Kim.

2. Layard.

minimum wage focus on its likely effects on youth employment and wages, it is also possible, in theory, for the minimum wage to shorten the duration of teenage jobs and thus increase the frequency with which youths change jobs.[1]

Though some headway has been made in determining the causes of changes in youth employment experiences, it is important to stress that major questions remain unanswered, and in particular the differential pattern of change between white and black youth.

THE CAUSES: INDIVIDUAL DETERMINANTS AND CORRELATES OF YOUTH EMPLOYMENT AND WAGES

We now turn to individual characteristics that contribute to differences in employment experience among youth. These are attributes that influence the experience of one youngster relative to another at a given point in time. It is important to realize from the start that most of the variation in employment and wages among individuals cannot be explained by differences among them that we can observe and measure, such as education or family income. Most of the variation is due to factors, such as individual tastes, opportunities, or chance that we are unable to explain. Nonetheless, the effect of some characteristics is very substantial. Among the most important determinants of youth employment and wages are:

Education: As we have already emphasized, high school dropouts are employed fewer weeks per year on average than high school graduates. More generally, out-of-school youths of any age with education below the average for their age group are employed noticeably less than other out-of-school youth in that age group.[1]

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[1] Hall.

Particular educational experiences may also affect employment and wages. Much public discussion and policy has centered on the potential influence of job training on later ability to find and do jobs. Yet, we have found that vocational training in high school is virtually unrelated to subsequent employment and wage rates, even for persons who obtain no further education after leaving high school. Academic performance, on the other hand, seems to be positively related both to the number of weeks per year that youth are employed and to their wage rates after entering the labor force full time.[2]

But most important, and possibly surprising, there is a very strong relationship between hours worked while in high school and later employment and wage rates, with persons who work in high school employed many more weeks per year and having higher wage rates when they enter the labor force full time than those who do not work in high school.[3] We have as yet not adequately differentiated between two possible explanations for these relationships: that working in high school reflects an underlying commitment and ability to perform well in the market, that the work experience itself enhances these characteristics, or most likely, that both of these possibilities interact. The relationship suggests, however, that high school work experience may hold significant potential for enhancement of later work experience and at the same time raises the possibility that unemployment among in-school youth, while different from that of out-of-school youth, may result in lost preparation for future work.

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[1] Rees and Gray.

[2] Meyer and Wise.

[3] Meyer and Wise.

Family Background: It is widely accepted that early family experiences are likely to affect later employment as well as educational attainment of youth. We have no knowledge of the early family experiences of youth, but we do have access to measures of some family characteristics, such as income. We have found that such measures are related to both school and labor force experiences, but the relationships are not entirely what we expected. For all youth, family background, as measured by parents' income, shows little relationship to employment. Thus family income apparently has little to do with the inclination of youth to seek employment or with their ability to find jobs, although it may affect inclination and ability to find work in an offsetting way. However, youth whose brothers and sisters have jobs are more likely to have jobs themselves.[1] This finding is subject to several interpretations. It may reflect local labor market conditions or characteristics common to all family members, or it could mean that employed siblings help other youth in the family to secure jobs.

Though children from wealthier families seem to be no more successful in finding jobs than those from poorer families, we have found that youngsters from wealthier families obtain jobs that pay more per hour.[1] The reasons for this pattern have yet to be determined.

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[1] Rees and Gray.

We have also found that youth in female-headed households and in households on welfare tend to have jobs less often than youth from other families, though the differences are not sizeable. Again, while this result is not surprising, it is not clear why this relationship is observed. Youth in families where the adult heads are less likely to have jobs may themselves be less likely to seek employment. On the other hand, youngsters from such families may simply have fewer job opportunities. Here too, however, once a youth is employed, family characteristics are not related to wage rates. It is possible, of course, that those who are the most productive on jobs are also the most likely to seek employment and the most likely to be hired.

Race: As noted earlier, black youth have noticeably lower chances of working than white youth, although the magnitude of black/white differences in employment differ by survey; in some surveys the differences are modest for high school graduates. In contrast, black and white youth wages tend to be quite similar for all educational levels, so that employed young blacks earn about as much as employed young whites. One reason for the downward trend in black youth employment has been a marked increase in the school attendance of young blacks. The increase in black schooling, however, explains only a small proportion of the black/white differences in employment that have arisen since 1954.

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[1] Meyer and Wise.

We find it implausible to explain the decreased employment in terms of discrimination of the traditional type, particularly in view of increased legal and other pressures placed on discriminators. Perhaps other factors having to do with the social conditions in inner city slums have worsened and have contributed to the weakened employment experiences of blacks. No empirically verified explanation presently exists.

THE CONSEQUENCES

Many persons have expressed the fear that periods of unemployment early in one's working career could have substantial adverse effects on employment in future years. We have found that these fears are largely unfounded, and that the evidence has often been misinterpreted to imply that there were large effects. In fact, there is little evidence that time spent out of work early in a youngster's career leads to recurring unemployment.[1] Rather, the cost of not working is the reduction in wages persons suffer later because they failed to accumulate work experience which employers reward. That early unemployment has little effect on later unemployment does not mean that young men and women who have unusually low levels of employment early in their working lives are unlikely to work less in later years.

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[1] Meyer and Wise; Ellwood.

Young men who do not enroll in college and spend some time unemployed their first year out of school, for example, are twice as likely to experience unemployment again than are their peers who escaped early unemployment.[1] But this effect is due almost entirely to persistence of individual differences like education, academic ability, and motivation. The existence of such characteristics creates a positive correlation between time worked in one year and that worked in the next and subsequent years. To isolate the effect of unemployment itself on future unemployment, it is necessary to control for these individual differences. Once individual differences are controlled for, so that persons can be compared only on the basis of early work experiences, there is little relationship between employment experience after high school and employment four years later.

This conclusion holds for widely differing groups of young men and probably for young women as well. It is supported by evidence on young men who do not enroll in college, including high school dropouts, who were followed in the National Longitudinal Survey of Young Men.[2] It is also supported by evidence on a large national sample of high school graduates surveyed as part of the National Longitudinal Study of the High School Class of 1972.[3] Comparable evidence based on young women in the National Longitudinal Survey of Young Women supports this conclusion as well.[4] This does not mean, of course, that we should be unconcerned that some persons will always tend to have poorer labor force experience than others. But it does mean that initial employment in itself does not increase or decrease employment over the long run. Thus, for example, simply creating jobs for persons right after high school should not be expected to increase the number of weeks that they will be employed four years hence.

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[1] Ellwood.

[2] Ellwood.

[3] Meyer and Wise.

[4] Corcoran.

Since wage rates increase with experience, there is, however, a cost of not working today. Individuals who are unemployed in their youth obtain lower wages in subsequent years because they have accrued fewer years of experience. The effect for high school graduates three or four years later appears to be modest, and it is somewhat less for women than for men.[1] Evidence for young men with less than 14 years education showed considerably higher estimates of the effects of early experience on wage rates three or four years later, upwards of 15 percent per year out of work.[2] All of this evidence is consistent with previous research findings on the relationship between earnings and experience. In short, unemployment does not by itself foster later unemployment, but the effect of unemployment is felt in lower future wages, and this effect may be quite substantial.

Not only is there little effect of early employment on subsequent employment but initial wage rates in themselves have little effect on subsequent wage rates. Once persistent individual differences are controlled for, there is virtually no relationship between wage rates early in a person's labor force experience and wages earned several years later.[1] After allowing for individual characteristics, a low paying job one year will not by itself lead to a low paying job three or four years later, according to our findings. Thus the fear that a low level job one year--as indicated by a low wage rate--will harm one's chances of obtaining a better job in later years appears to be unfounded.

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[1] Meyer and Wise; Corcoran.

[2] Ellwood.

These findings are distinct from the observation that unemployment varies according to occupational characteristics. Young persons working in occupations with high initial wages but slow wage growth, and in occupations whose work force is highly mobile across industries also have higher rates of unemployment.[2]

CONCLUSIONS

The NBER research has illuminated several aspects of youth employment and unemployment. We have found that severe employment problems are concentrated among a small proportion of youth with distinctive characteristics but that for the vast majority of youth, lack of employment is not a severe problem. Thus, the youth unemployment crisis should be thought of as one specific to only a small proportion of youth, not as a general problem. Black youth are less likely than white youth to be employed, but once employed the two groups have similar wage rates; this rough equality is a recent development. While work experience and academic performance in school have been found to be related to employment and wages, vocational training in school has not. Aggregate economic activity has been found to be a major determinant of the level of youth employment.

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[1] Meyer and Wise

[2] Brown.

Early employment experience has virtually no effect on later employment, after controlling for persistent characteristics of individuals, like education. Similarly, wages earned upon entry into the labor force have no effect themselves on wage rates earned a few years later. But not working in earlier years has a negative effect on subsequent wages because wage increases are related to experience.

Finally, we have found large differences between employment and unemployment rates based on Current Population Survey data--the traditional source for such information--and evidence based on two other recent large scale surveys. This uncertainty not only leads to questions about the basic magnitude of youth employment and unemployment but also complicates analysis of youth employment experiences as well.

Teenage Unemployment: What is the Problem?

Martin Feldstein*

David Ellwood**

An individual is officially classified as unemployed if he is not working and is seeking a full-time or part-time job.[1] In recent years, 50 percent of the unemployed were less than 25 years old. Teenagers alone accounted for half of this youth unemployment or 25 percent of total unemployment. In 1978, an average of 1.56 million teenagers were classified as unemployed, implying an average unemployment rate of 16.3 percent of the teenage labor force.[2]

It is clear therefore that teenagers account for a large share of the high unemployment rate in the United States. But how much of this teenage unemployment represents a serious economic or social problem? How many of these unemployed are students or others seeking part-time work? How much of all teenage unemployment represents very short spells of unemployment by those who move from job to job and how much represents really long-term unemployment of those who cannot find any job or any job that they regard as acceptable?

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*President, National Bureau of Economic Research, and Professor of Economics, Harvard University

**Research Analyst, National Bureau of Economic Research, and Graduate Student in Economics, Harvard University.

This study was prepared as a background paper for the NBER Project on Youth Joblessness and Employment. We are grateful for comments on our earlier draft, especially the suggestions of Jacob Mincer, Linda Leighton and Lawrence Summers. The views expressed are those of the authors and should not be attributed to any organization.

[1] Individuals who are on layoff from a job to which they expect to be recalled are also classified as unemployed even if they are not actively seeking work.

[2] The unemployment rate for a demographic group is calculated as the percentage of the corresponding labor force who are currently classified as unemployed. The labor force is defined as everyone in that demographic group who is either employed or unemployed. An individual may be both attending school and in the labor force if he or she is working part-time or full-time or is looking for such work.

Among those who are not officially classified as unemployed but are neither working nor in school, how many should really be regarded as "unemployed but too discouraged to look" and how many should be classified as just "not currently interested in working"? And even among those who are officially classified as unemployed, how many are unemployed by the official definition but not really interested in work at the current time?

To shed light on these questions, we have analyzed the detailed information on youth employment and unemployment that is collected in the Department of Labor's monthly Current Population Survey. We have not relied on the published summaries of this survey but have examined and tabulated the basic records on more than 5,000 individual teenage boys about whom information was obtained in the Current Population Surveys of March 1976 and a similar size sample in October 1976. Analyzing the raw data has the very important advantage of permitting us to examine a variety of special subgroups that cannot be studied with the published summaries.

In particular, we decided quite early in our study to limit our attention to male teenagers who are not enrolled in school.[1] We believe that the problems and experience of the in-school and out-of-school groups of unemployed teenagers are very different and must be studied separately.[2] Since, as we show below, half of the male unemployed teenagers are still in school, looking at both groups together can obscure much that is important. Moreover, the social and economic problems of unemployment may be of greater significance for the out-of-school group than for those who are still in school. Limiting our analysis to boys also reflects a view that the problems and experiences of the boys are likely to differ substantially from those of girls of the same age so that the two should be studied separately.

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[1] In the earlier version of this paper, we focussed on the male teenagers who do not report attending school as their "major activity." An individual may be enrolled but also working. For most purposes, the two methods of classification give similar results but we were convinced by subsequent comment and analysis that classifying by enrollment is more appropriate, especially for 16 and 17 year olds.

[2] We are of course aware that remaining in school represents an economic decision and should in principle be regarded as endogenous to the problem we are studying. It would be interesting to extend the current analysis to examine the relation between work availability and the decision to remain in school.

Even with the study limited to out-of-school young men, we have a sample of 1,451 individuals in October 1976. This is large enough to make statistically reliable estimates of unemployment and employment rates for most major groups.[1] In some cases, however, e.g., when nonwhites are classified by family income, the sample becomes too small to permit estimates to be made with great confidence. In these cases, as in others where a larger sample is desirable, it would be useful in the future to pool data from several monthly surveys.

Since our analysis refers primarily to the unemployment experienced in October 1976 and, in some cases, during the preceding year, it is useful to describe briefly the state of the labor market during that period. In October 1976, the overall unemployment rate for the population as a whole was a relatively high 7.2 percent. Unemployment had been falling from a peak rate of 9.1 percent in June 1975. The mean durations of unemployment were therefore very long; the 14.2 week mean duration of unemployment for all the unemployed in the October 1976 survey was roughly 25 percent longer than the average duration of 11.5 weeks that prevailed in the years from 1960 through 1975. Our study should therefore be seen as an analysis of the experience of out-of-school young men during a time in which the labor market was depressed but improving.

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[1] In estimating unemployment and employment rates, a sample of 100 yields a standard error of no more than 0.005. Appendix Table A-1 presents selected sample sizes. Table A-2 presents the standard errors for probabilities based on selected sample sizes.

This should be remembered in interpreting any of our findings, a warning that will not be repeated. It would clearly be interesting to repeat our analysis for a year like 1974 when the unemployment rate for all persons was only 5.6 percent as well as for 1979 when those data became available.[1]

Our finding may be summarized very briefly:

Unemployment is not a serious problem for the vast majority of teenage boys. Less than 5 percent of teenage boys are unemployed, out of school, and looking for full-time work. Many out of school teenagers are neither working nor looking for work and most of these report no desire to work. Virtually all teenagers who are out of work live at home. Among those who do seek work, unemployment spells tend to be quite short; over half end within one month when these boys find work or stop looking for work. Nonetheless, much of the total amount of unemployment is the result of quite long spells among a small portion of those who experience unemployment during the year.

Although nonwhites have considerably higher unemployment rates than whites, the overwhelming majority of the teenage unemployed are white. Approximately half of the difference between the unemployment rates of whites and blacks can be accounted for by other demographic and economic differences.

There is a small group of relatively poorly educated teenagers for whom unemployment does seem to be a serious and persistent problem. This group suffers much of the teenage unemployment. Although their unemployment rate improves markedly as they move into their twenties, it remains very high relative to the unemployment rate of better educated and more able young men.

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[1] We have repeated the analysis for the two other recent years for which data are available, 1975 and 1977. The results are quite similar to those for 1976 reported in the text of this paper. Tables for these years are available from the authors.

1. More than 90 percent of all male teenagers are either in school, working or both. Most unemployed teenagers are either in school or seeking only part-time work. Only 5 percent of teenage boys are unemployed, out of school and looking for full-time work.

Although the unemployment rate among teenage boys was 18.3 percent in October 1976, this figure is easily misinterpreted for two reasons. First since most teenagers are in school and neither working nor looking for work, the labor force size on which this unemployment rate is calculated is only a fraction of the teenage population. The unemployed therefore represent a much smaller percentage of the teenage population than they do of the teenage labor force. Second, more than half of the unemployed teenagers are actually enrolled in school and generally interested only in some form of part-time work.

It is reasonable to classify prime age men into the "employed" and "not employed" and to regard the situation of the first group as satisfactory from a social and economic standpoint and that of the second group as unsatisfactory. This is clearly inappropriate for teenagers. The "satisfactory" group for teenagers includes those in school as well as those at work and therefore more than 90 percent of this age group, almost the same as the "satisfactory status" rate for prime age males. Less than 5 percent of teenage boys are unemployed, out of school and looking for full-time work. The problem of unemployment affects only a very small fraction of teenagers.

The detailed statistics on which these statements are based are presented in Table 1. Nearly 70 percent of male teenagers were enrolled in school in October 1976. Among the teenage boys who are officially classifed as unemployed, more than half (52.7 percent) are enrolled in school. There are

Table 1

Activities of Male Teenagers, March 1976

	16-17		18-19		16-19	
	Population	% of Population	Population	% of Population	Population	% of Population
In School						
Employed	1,307,233	31.1	731,300	18.5	2,038,533	25.0
Unemployed	317,419	7.5	126,620	3.2	444,039	5.4
Full Time	22,000	0.5	28,399	0.7	50,399	0.6
Part Time	295,419	7.0	98,221	2.5	393,640	4.8
Not-In-Labor-Force	2,174,278	51.8	1,048,669	26.5	3,222,947	39.5
Total Population	3,798,930	90.4	1,906,589	48.3	5,705,519	69.9
Not in School						
Employed	209,259	5.0	1,506,038	38.1	1,715,297	21.0
Unemployed	82,454	2.0	316,251	8.0	398,705	4.9
Full Time	74,949	1.8	304,355	7.7	379,304	4.7
Part Time	7,505	0.2	11,896	0.3	19,401	0.2
Not-In-Labor-Force	105,996	2.5	226,980	5.7	332,976	4.1
Total Population	397,709	9.6	2,049,269	51.7	2,446,978	30.1
Total Civilian Population	4,196,639	100.0	955,858	100.0	8,152,497	100.0

Source: Tabulations of the October 1976 Current Population Survey.

only 79,000 boys who are out of school and seeking full time work.[1] Of course, the fact that half the teenage unemployed are in school does not mean that the unemployment rate among out-of-school teenage boys is half of the unemployment rate for all teenage boys. The two rates are in fact quite similar: 18.3 percent overall and 18.9 percent among out-of-school boys.

It is also clear that the experience of 16 and 17 year olds is very different from that of 18 and 19 year olds. While 90 percent of the younger boys are in school, only 48 percent of the older boys are. Among the 16 and 17 year olds who are classified as unemployed, nearly 80 percent are in school and less than 25 percent are seeking full-time work. In contrast, among the 18 and 19 year olds who are classified as unemployed, only 29 percent are in school and more than 75 percent are seeking full-time work. Only 1.8 percent of the 16 and 17 years olds are out of school, unemployed and seeking full time work. We are reminded that the official unemployment rate once included the experience of 14 and 15 year olds but that the age limit was raised to reflect the growing school enrollment of this group. It may again be time to raise the age threshold for official labor force participation. Excluding 16 and 17 year olds, with their official unemployment rate of more than 20 percent, would reduce the overall unemployment rate for men of all ages from 7.2 percent to 6.9 percent.

These comments should not be taken as minimizing the importance of unemployment for some young people. The figures do show however that only a very small fraction of teenagers are unemployed and that only 46 percent of the unemployed are both not in school and looking for full-time employment. Less than 5 percent of teenage boys are out of school, without work, and seeking full-time employment.

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[1] Recall that we classify as "in school" anyone who is enrolled, whether or not school is his major activity. If we use the "major activity" basis of classification instead, the number of out-of-school boys who are seeking full-time work is essentially unchanged at 394,000. The total unemployed and out-of-school group (seeking part-time or full-time work) is 399,000 based on "enrollment" and 416,000 based on "major activity."

2. Most spells of teenage unemployment are quite short and most teenage jobseekers have relatively little trouble in finding work. The bulk of unemployment is experienced by a relatively small group of teenagers with long spells of unemployment.

Short spells are characteristic of most out-of-school male teenagers who become unemployed. In October 1976, 45.5 percent of the unemployed in this group had been unemployed for four weeks or less. The survey also found that 16.2 percent of the unemployed in this group had been unemployed for between 5 and 8 weeks. Only 10.7 percent of all the unemployed in the survey had been unemployed for as long as 26 weeks. Because those who find work relatively quickly are less likely to be counted in the distribution of unemployed, these figures actually overstate the fraction of longer spells. In fact, considerably more than one-half of all the teenage boys who become unemployed are no longer so within just one month.[1]

The experience of young people during the summer also implies that finding employment is not difficult for most young people. Although detailed data is not available by sex and the level of school attainment, the published figures permit us to trace the overall experience of teenagers of both sexes on a month by month basis.[2] In March 1976, 3.8 million 16 to 19 year olds were in the full-time labor force. This rose to 7.0 million in June, 8.3

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[1] Clark and Summers report that 70 percent of spells end in one month; some of these spells end with the teenagers leaving the labor force. See Kim Clark and Lawrence Summers, "The Dynamics of Youth Unemployment," NBER Working Paper, No. 274, 1979.

[2] These figures come from the 1977 Handbook of Labor Statistics (U.S. Department of Labor 1978).

million in July and 7.5 million in August b[illegible]pping back to approximately 4 million for the rest of the year. [illegible] extra entrants to the full-time labor force between March and [illegible] or 89 percent were working in July. Although the numbe[illegible] between the spring and summer, the unemployment rate [illegible] sharply from 22.6 percent in March to 16.3 percent in July and [illegible] in August. It is clear that this comparatively able group of teenage boys and girls had relatively little difficulty finding work.

The labor market's ability to increase teenage employment by more than 100 percent between May and July is certainly remarkable. Employers clearly anticipate a seasonal increase in the supply of teenagers and organize production to take advantage of their availability. We are struck by the contrast between this experience and the claim that much of the current high teenage unemployment rate is due to the demographic shift that increased teenagers from 7 percent of the labor force in 1958 to 10 percent today. If production can adjust so rapidly to the seasonal shift in the demographic composition of the labor force, it would be surprising if it could not adjust to the much slower change in demography over the past two decades. This leads us to believe that too much weight has generally been given to the demographic explanation of the rising teenage unemployment rate.

While most teenagers have little problem with unemployment, teenage unemployment is concentrated in a group that experiences long periods of unemployment. Table 2 presents information on the distribution of unemployment in 1975 based on the responses of the out-of-school group in the March 1976 Current Population Survey.[1] Table 2 reveals that in 1975 nearly

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[1] The March survey is used for these calculations because information on unemployment in the previous year is not collected in October.

Table 2

Distribution of Population and Total Unemployment by Weeks Unemployed in the Previous Year

Weeks Unemployed Last Year	Percent of Population	Percent of Those with Some Unemployment	Pecent of All Unemployment in the Year
None	63.7	0.0	0.0
1-4	8.5	23.5	3.8
5-8	4.9	13.5	5.0
9-13	5.2	14.4	9.3
14-26	9.3	25.7	31.3
26+	8.3	22.9	50.7

Source: Tabulations of the March 1976 Current Population Survey. All figures refer to male teenagers whose major activity in March 1976 was not classified as attending school.

two-thirds of these teenagers experienced no unemployment at all. Another 13 percent were unemployed for a total of less than two months. Only one teenager in twelve was out of work for a total of more than 26 weeks during the year, but this high unemployment group accounted for 52 percent of all the weeks of unemployment among these teenagers. Thus about half of all unemployment among male out-of-school teenagers in a year is concentrated in a group of roughly 250,000 boys.

3. Many of the teenagers who are out-of-school and out-of-work are not officially classified as "unemployed." Most of this "out of the labor force" group show relatively little interest in finding work. For many of them, there is relatively little pressure or incentive to find work.

More than 45 percent of the out-of-school but not employed teenage boys are officially classified as out-of-the-labor-force rather than unemployed.[1] This means they reported having no work-seeking activity during the previous four weeks, including such things as asking friends or looking in the newspaper. The evidence that we present later in this section indicates that only a relatively small proportion of these young men would really like to work.

Kim Clark and Larry Summers[2] have shown that a substantial fraction of all measured spells of unemployment end with the individual leaving the labor force. They argue that the distinction between youngsters who are out of work and seeking a job and those who are out of work but not seeking employment is questionable and suggest further that most persons without work might be regarded as unemployed. According to this interpretation current unemployment figures understate the magnitude of the problem. While we agree that the distinction between the unemployed and those out of the labor force may be poorly captured in the data, our evidence suggests that the vast majority of those out of the labor force cannot reasonably be classified as "unemployed" with its implication of active interest in finding work. Indeed it is quite possible that current unemployment figures overstate the problem since many unemployed move frequently to the out of the labor force status where few report a desire for work.

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[1] An individual is classified as out of the labor force if he is neither employed nor seeking work. The figures in Table 1 indicate that there were 333,000 teenage boys who were not in the labor force in October 1976. By comparison there were 399,000 unemployed boys. The out-of-the-labor-force group thus accounted for more than 45 percent of those who were out of school but not working.

[2] Kim Clark and Lawrence Summers, "The Dynamics of Youth Unemployement," NBER Working Paper No. 274, 1979.

Our interpretation of this evidence reflects our conclusion that the young men who are out of the labor force are not "discouraged workers" who have stopped looking because they believe no work is available. We have reached this conclusion after analyzing the data about the out of the labor force group that was collected in the March 1976 survey. These data are of two types: (1) questions about the individual's interest in working and beliefs about job availability[1] , and (2) evidence on the financial incentives and pressures to seek work.

When the out-of-school teenagers who had not done anything to look for work during the past four weeks were asked, "Do you want a job now?", only 37 percent answered yes.[2] Forty-six percent said no and 17 percent said they did not know.[1]

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[1] These questions are asked only of a random subsample of the out-of-the-labor-force group. Some of this information is available for March and not for October.

[2] The question in the CPS may be answered by one adult in the household for all persons in the household. The questions about a teenager are typically answered by his mother although the group that is out-of-school and out-of-work may be more likely than usual to be present at the interview.

Among the out-of-the-labor-force group, only 3.5 percent said they wanted a job but believed there was no work, and 2.8 percent said that the prospective employers thought they were too young. Thus no more than 21 percent of those in the out of the labor force group desire employment but believe that search would not result in finding a job. In 63 percent of the cases, the individual just did not want a job. An additional 7.1 percent said they did not look because they were attending school even though school was not given as their major activity.

We believe that much of the high unemployment and nonemployment rates among the out-of-school young men reflect the lack of pressure or incentive to find work. Although unemployment insurance is relatively unimportant for this age group,[2] the family acts as an alternative source of income when young people are not working.[3] More than 87 percent of the unemployed in this group live with parents (80.5 percent) or other relatives (7.0 percent). Only 7.5 percent live alone or with a family of their own. Among the group that is not in the labor force, 97 percent live with parents (89.6 percent) or other relatives (7.4 percent). While the unemployed teenagers come disproportionately from lower income families, nearly two-thirds of the unemployed were in families with incomes above $10,000 in 1976 and 22 percent were in families with incomes over $20,000.

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[1] Although the sample of individuals who were asked this question was so small that these percentages cannot be regarded as precise estimates of the true percentages for all teenagers who were out of the labor force, there are enough observations to assert that there is less than one chance in 10 of observing an estimated "yes" response rate as low as 37 percent if the "true" fraction of potential "yes" responses is even 50 percent or higher. (Evidence for October 1976 further supports this conclusion since an even lower fraction of the out-of-the-labor-force group expressed interest in working.)

[2] Data on the receipt of unemployment benefits were collected in a special May 1976 survey. Only 10 percent of unemployed male teenagers not in school received unemployment benefits.

[3] It would be very interesting to have more data on the way in which a young person's unemployment affects his family's cash and in-kind gifts to him and his expected contribution to the overall family budget.

4. The problem of unemployment and nonemployment is concentrated in a group with little education. The unemployment and nonemployment rates in this group drop sharply as they move into their early twenties. Nevertheless, the rates remain very high among those who do not complete high school.

Since unemployment is concentrated in a group of teenagers with relatively little schooling, it is worth emphasizing that nearly 70 percent of 16 to 19 year old males are still in school. The out-of-school group whose unemployment we are studying therefore left school before two-thirds of those in their age cohort. Moreover, for our out-of school group, unemployment rates are much higher among those who did not complete high school (12 years of education). Table 3 shows that these school dropouts accounted for 57.5 percent of the unemployed and 58.0 percent of the nonemployed. They had an unemployment rate of 28.2 percent and a nonemployment rate of 42.1 percent. The rates for nonwhite dropouts were even higher.

Table 4 compares the unemployment rates of teenagers with the unemployment rates of 20 to 24 year olds at each level of education. Among those with less than 12 years of education, the unemployment rate drops from 0.282 to 0.175, a drop of 38 percent. The decreases for the two groups with more years of schooling is relatively smaller (a 20 percent decline for both groups), but the final unemployment rates are substantially lower. Among 20 to 24 year olds, those who did not complete high school have nearly twice the unemployment rate of those who did. Note that the unemployment rate for all

Table 3

Education and Unemployment

	Years of Schooling			
	Less than 12 Years	12 Years	More than 12 Years	All
Percentage Distribution of				
Population	41.2	53.8	5.1	100.0
Labor Force	38.4	56.9	4.7	100.0
Unemployed	57.5	40.2	2.3	100.0
Nonemployed	58.0	37.3	4.7	100.0
Unemployment Rates				
Whites	.264	.105	.069	.163
Nonwhites	.412	.396	.513	.406
All	.282	.133	.093	.189
Nonemployment Rates				
Whites	.386	.171	.216	.259
Nonwhites	.618	.501	.796	.571
All	.421	.208	.277	.299

Source: Tabulations of the October 1976 Current Population Survey. All figures relate to teenage boys who were not enrolled in school at the time of the survey.

Table 4

Unemployment Rates by Age and Education

Years of Schooling	Age		Age and Race			
			Whites		Nonwhites	
	16-19	20-24	16-19	20-24	16-19	20-24
Less than 12 Years	.282	.175	.264	.151	.412	.276
12 Years	.133	.106	.105	.098	.396	.168
More than 12 Years	.093	.074	.069	.063	.513	.184
All	.189	.110	.163	.097	.406	.207

Source: Tabulations of the October 1976 Current Population Survey. All figures relate to males who were not enrolled in school at the time of the survey.

20 to 24 year olds (0.110) is actually 42 percent lower than the teenage rate, reflecting the change in the mix of the labor force to those with more education and lower unemployment rates as well as the decline in rates within each demographic group.

A similar pattern is seen for each race group. Among those with less than 12 years of education, the white unemployment rate drops by 43 percent and the nonwhite unemployment rate drops by 33 percent. For the groups with more education, the gains are relatively greater for nonwhites but the sample is too small to regard these differences as statistically significant.

Table 5 presents comparable figures for nonemployment. It will again be seen that the rates for the lowest education group improve substantially with time but still remain quite high. Once again, the total rate declines by more than the decline at each education level because the out-of-school population changes to include a higher fraction of young men with more education.

Although these two tables show that there is a substantial improvement in the condition of the low education teenagers as they age, the figures should also serve as a warning that the problem of high unemployment and nonemployment among the low education group does not fully correct itself as these problem teenagers get older.

5. Nonwhites have considerably higher rates of unemployment and nonemployment than whites do. However, since nonwhites are a relatively small fraction of the teenage population, they account for only a small portion of unemployment and non employment. Lowering the unemployment rate of the nonwhite group to the rate of the white group would eliminate less than 60,000 unemployed teenagers in the whole country and would only lower the unemployment rate for all out-of-school male teenagers from 19 percent to 16 percent.

Table 5

Nonemployment Rates by Age and Education

Years of Schooling	Age		Age and Race			
			Whites		Nonwhites	
	16-19	20-24	16-19	20-24	16-19	20-24
Less than 12 Years	.421	.264	.386	.215	.618	.436
12 Years	.208	.147	.171	.129	.501	.286
More than 12 Years	.277	.112	.216	.101	.796	.235
All	.299	.162	.259	.137	.571	.330

Source: Tabulations of the October 1976 Current Population Survey. All figures relate to males who were not enrolled in school at the time of the survey.

Nonwhite teenagers suffer very high rates of unemployment and nonemployment. Forty percent were unemployed in October 1976; nearly 60 percent were without work. While these figures clearly show a serious employment problem for nonwhite teenagers, it should be remembered that since the bulk of teenagers are white, the bulk of the out-of-school teenage unemployed are also white.

Table 6 summarizes the racial composition of unemployment and nonemployment among out-of-school male teenagers. Since nonwhites constitute only 12.7 percent of the 2.45 million boys in this group, they account for only a small fraction of the overall unemployment and nonemployment despite their relatively high unemployment and nonemployment rates. In October 1976, whites represented 77 percent of the unemployed, 76 percent of the not employed and 74 percent of those not in the labor force. Even among those out of work for 23 weeks or more, whites accounted for 77 percent.

By using the March 1976 survey, it is possible to obtain additional information on the relative magnitudes of white and nonwhite unemployment. (This requires using the "major activity" criteria of classifying an individual's "school" status; this decreases the in school population and raises the share of whites in the unemployed from 77 percent to 81 percent.) The March survey figures indicate that whites accounted for 79 percent of those who experienced at least 26 weeks of unemployment in 1975 and 80 percent of the weeks of unemployment in that year. The March survey also provides evidence on unemployment in the central cities of Standard Metropolitan Statistical Areas. Because nonwhites constituted 24.3 percent of the male teenage out-of-school labor force in the central cities of Standard Metropolitan Statistical Areas (in comparison to 24.2 percent nationally), they accounted for a larger share of

Table 6

Unemployment Experience of White and Nonwhite Out-of-School Male Teenagers

	Number of Persons		Proportion of Persons		Unemployment and Nonemployment Rates	
	White	Nonwhite	White	Nonwhite	White	Nonwhite
Unemployed*	307,214	91,491	77.1	22.9	.163*	.406
Not Employed**	553,382	178,299	75.6	24.4	.259**	.571
Not in Labor** Force	246,168	86,808	73.9	26.1	.115**	.278
Long Term Unemployed (more than 13 weeks in the current spell)	81,619	23,973	77.3	22.7	N/A	N/A

Source: Tabulations of the October 1976 Current Population Survey. All figures relate to teenage boys who were not enrolled in school at the time of the survey.

* Rate as a percent of labor force.

** Rate as a percent of population.

total unemployment in central cities. But even there, nonwhites represented only 36 percent of the unemployed. Whites accounted for 64 percent of the unemployment in the central cities and 84 percent outside the SMSA's.[1] Even among families with incomes of less than $10,000, whites accounted for 70 percent of the unemployment nationally and 50 percent in central cities. The stereotyped image of an unemployed teenager as a black central city resident corresponds to less than 15 percent of the unemployed.

The figures in Table 6 imply that reducing the nonwhite unemployment rate from 40.6 percent to the 16.2 percent that prevailed among whites would cut nonwhite unemployment from 91,491 to 36,732, a reduction of 54,759. This accounts for only 13.4 percent of the total of 408,705 unemployed male out-of-school teenagers. Reducing the nonwhite unemployment rate to the white rate would therefore only lower the total unemployment rate from 18.9 percent to 16.3.

Again, we want to stress that we are not minimizing the importance of the high rates of unemployment and nonemployment among the nonwhite teenagers. With 57 percent not employed, there is clearly a serious employment problem among nonwhite out-of-school teenagers. It is important, however, to recognize that the vast majority of employed and nonemployed teenagers are white. Reducing the unemployment rate of nonwhite teenagers to the corresponding rate for whites would eliminate less than 15 percent of all the current unemployment among teenage boys who are not in school.

6. Approximately half of the difference between the unemployment rates of white and nonwhites can be accounted for by other demographic and economic differences. Among the very low income households, the unemployment rates of

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[1] Among the 370,273 unemployed whites, 97,701 lived in central cities of SMSA's. For nonwhites, the corresponding figures are 88,964 and 55,781.

whites and nonwhites are similar. Rising family income appears to be associated with a much greater fall in the unemployment rate for whites than for nonwhites.

We have examined how unemployment rates differ within each race by schooling, family income, and age. More specifically, we have divided the population into 48 non-overlapping groups based on all interactions among these three factors. Thus, one group contains only those 17 year olds with exactly 12 years of schooling who live in a family whose income (excluding that of the teenagers) is between $10,000 and $20,000. Each group is further divided into whites and nonwhites, and the unemployment rate is calculated for each subgroup. On the basis of this detailed information, we can calculate how much of the white-nonwhite difference in unemployment rates is due to differences between the rates in each of the 48 demographic groups and how much is due to differences in the demographic composition of the white and nonwhite groups.[1] The results are summarized in the first two columns of Table 7.

The actual unemployment rate for white, male teenage boys who are out of school is 16.3 percent; the corresponding rate for nonwhites is 40.6 percent. If nonwhites had the same demographic composition as whites but retained their annual unemployment rates in each demographic group, their overall unemployment rate would fall from 40.6 percent to 27.9 percent. This is shown in Table 7 as the unemployment rate based on "white weights and nonwhite rates." These figures imply that the difference in the demographic composition of the two race group accounts for 12.7 percentage points of the 24.3 percentage point difference in the overall unemployment rates, i.e. for more than 50 percent of the difference between the races.

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[1] Although the number of observations in each of the 48 cells is small, the standard error of the mean depends essentially on the total number of observations. Similar results are obtained with the data for the March Survey.

Table 7

Demographically Adjusted Unemployment and Nonemployment Rates of Whites and Nonwhites

	Unemployment Rates		Nonemployment Rates	
	White Weights	Nonwhite Weights	White Weights	Nonwhite Weights
White	.163	.210	.259	.325
Nonwhite	.279	.406	.469	.571

Source: Tabulations of the October 1976 Current Population Survey. All figures refer to out-of-school male teenagers.

Table 7 also shows the implications of reversing this procedure and calculating the unemployment rate that whites would have if they retained their actual unemployment rate in each demographic group but had the same demographic composition as the nonwhites. With the nonwhite demographic weights, the white unemployment rate would rise from 16.3 percent to 21.0 percent, an increase of 4.7 percentage points or only about 20 percent of the difference between the observed unemployment rates.

Similar calculations for nonemployment rates are also presented in Table 7. The first type of adjustment, i.e., using the white demographic composition, results in a decrease in the nonwhite nonemployment rate from 31.2 percentage points to 21.0 percentage points, a reduction of 33 percent. Similarly, applying nonwhite weights to white unemployment rates raises the white nonemployment rate from 25.9 percent to 32.5 percent, and accounts for only 21 percent of the race difference in nonemployment rates.

In short, a limited set of demographic factors can account for a substantial part of the racial difference in unemployment rates and a smaller part of the difference in nonemployment rates. Changing the demographic weights is more important for the nonwhite population than for whites.

We have extended our analysis of the relationship between race and unemployment by examining the unemployment rates of white and nonwhite teenagers in families at different income levels.[1] Two interesting conclusions emerge from this analysis. First, among low income families there is relatively little difference in the unemployment rates of whites and nonwhites. More precisely, in families with incomes below $10,000 (excluding any income of the teenager) white out-of-school boys had an unemployment rate of 0.26 while nonwhites had a rate of 0.30. Similarly, the nonemployment rates for whites was 0.39 while that for nonwhites was 0.45.

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[1] We use the March 1976 survey to obtain more detailed income information.

Our second finding is that rising family income appears to be associated with a much greater fall in unemployment rates for whites than for nonwhites. Among white teenagers, the unemployment rate drops from 0.26 in families with incomes below $10,000 to 0.14 in families with incomes of $10,000 to $20,000. The nonwhites show no decline at all; the unemployment rate actually rises slightly from 0.30 to 0.33. The same lack of improvement with income is seen in the nonemployment rates of nonwhites; while the white nonemployment rate drops from 0.39 to 0.22, the nonwhite rate rises from 0.45 to 0.54. Only when family incomes rise to more than $20,000 does the experience of whites and nonwhites become similar. The unemployment rates for this income group are 0.26 and 0.18 for whites and nonwhites respectively while the corresponding nonemployment rates are 0.24 and 0.25.

The poor employment of middle income nonwhites remains a puzzle to us. Our sample is too small to pursue this by further disaggregation but we believe that much could be learned by pooling samples in order to explore whether this apparent difference between middle income whites and nonwhites was just due to chance in our sample and, if not, whether it can be explained by such things as location or education.

7. Conclusion.

It is our conclusion that unemployment is not a serious problem for the vast majority of teenage boys. School is the predominant activity of the young. For many of the out of school but not employed group, the data provide evidence of weak labor force attachment and little incentive or pressure to find work. Most youngsters who do seek work remain unemployed only a short time.

Nonwhites suffer disproportionately high unemployment rates, but whites still represent the vast majority of unemployed young people. Nearly half of the differences in white and nonwhite unemployment rates are attributable to demographic differences in age, schooling, and family income. Unemployment rates of whites and nonwhites appear to be much more similar at the high and low ends of the income distribution than in the middle. The mystery is the middle class nonwhite teenagers who suffer far more unemployment than their white counterparts.

There is a small group of relatively poorly educated young men for whom teenage unemployment is a serious problem. High school dropouts suffer over half of the teenage unemployment and these persons show only a slow improvement as they reach their twenties.

In considering these findings, it should be borne in mind that the results reported in this paper are based on samples for 1976 only. As we noted above, we have repeated the analysis by examining data from 1975 and 1977 and found quite similar results. It would nevertheless be useful to extend these calculations to other years in which economic conditions were substantially different from 1975 through 1977.

This paper is not the place to discuss the implications of our evidence for appropriate policies to deal with youth unemployment. It is appropriate however to conclude with a few words of caution. Since we have emphasized that the real problem of teenage unemployment is currently concentrated in the relatively small group that experiences long periods of unemployment, it may be tempting to believe that the problem could be solved by a program of targeted job creation. The 250,000 boys with long periods of unemployment who currently account for more than half of the year's unemployment among out-of-school teenage boys could in principle be hired for a cost of $3 billion even if they were paid more than twice the minimum wage. The primary dangers in such an approach is that the provision of relatively attractive public-sector jobs could induce a very much larger number of boys to seek such positions. This could detour many of those who have little or no problem with unemployment away from more productive jobs or from additional schooling. The challenge to public policy is thus to create opportunities for employment and on-the-job training for those who would otherwise experience long periods of nonemployment without providing adverse incentives to the vast majority of young people.[1]

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[1] See the discussion of such policies in Martin Feldstein, "Lowering the Permanent Rate Of Unemployment," Joint Economic Committee, U.S. Congress (Government Printing Office: Washington, 1973) and Martin Feldstein, "Economics of the New Unemployment," The Public Interest, 1973.

Table A-1

Selected Sample Sizes of Males
Not Enrolled in School - October 1976

October	16-19		20-24	
	White	Non-White	Write	Non-White
All education levels				
Population	1250	201	3460	461
Labor force	1106	154	3305	396
Under 12 years education				
Population	507	97	654	166
Labor force	421	68	604	132
12 years education				
Population	680	96	1757	202
Labor force	632	82	1696	176
Over 12 years education				
Population	63	8	1049	93
Labor force	53	4	1005	88

Table A-2

Table of Standard Errors for Probabilities

Estimated Probability of Rate

Sample Size	.1 or .9	.2 or .8	.3 or .7	.4 or .6	.5 or .5
10	.10	.13	.15	.16	.17
25	.06	.08	.09	.10	.10
50	.04	.06	.07	.07	.07
100	.03	.04	.05	.05	.05
250	.02	.03	.03	.03	.03
500	.01	.02	.02	.02	.02
1000	.01	.01	.01	.01	.01

The Youth Labor Market Problem In the United States, An Overview

Richard B. Freeman
J. L. Medoff*

The unemployed young person has replaced the unemployed breadwinner as the focus of much concern about joblessness in the United States and other countries. In part, the upsurge of interest reflects the major demographic development of the 1960's and 1970's -- the increased proportion of young persons in the population -- which has raised the youth share of the unemployed. In part also, it reflects an upward trend in rates of joblessness among some groups of young persons, notably blacks, relative to the population as a whole. Considerable social concern has also been expressed about the correlates of youth joblessness -- crime, drug abuse, suicide, and illegitimate births -- and about potential longterm consequences in the form of a 'lost generation' of young workers. What are the quantitative dimensions of the youth joblessness problem in the United States? In what ways is youth unemployment similar or dissimilar to adult unemployment? How concentrated is the problem among minorities? To what extent is the lack of employment associated with other major social problems? What questions and topics must be addressed if we are to understand the nature of the youth labor market problem?

This paper addresses these questions with quantitative data from various national sources. It presents an overview of the nature of the youth labor market problem in the U.S., sets out the principal patterns in the data, and develops the questions to which they give rise. Section I focuses on job market phenomena, as depicted in Current Population Survey (CPS) and related data. It shows that the problem of high and increasing joblessness is concentrated among black youth and the less educated and is intimately associated with movements into and out of the labor force and that the youth market problem has wage as well as employment dimensions.

*We have benefitted from the research assistance of Wayne Gray, Elizabeth Philipp, Martin Van Derrborgh, David Mandelbaum, Alison Hopfield and Ana Preston

Section II turns to associated social problems, which place youth unemployment at the center of major national socioeconomic problems: crime, the family structure, illegitimate births, and so on. Regardless of how one views the job market difficulties of the young, the interrelation between employment problems and other social ills clearly merits serious attention. Section III considers briefly the research questions to which the quantitative analysis directs attention.

I. Quantitative Dimensions of Job Market Problems: Current Population Survey Evidence

There are several alternative ways in which to measure the labor market position of young workers: through indicators of the amount of labor, the type of jobs held, rates of pay, and so on. Each of the measures has both advantages and disadvantages for analysis, highlighting some aspects of the position of the young at the expense of others. The most widely used indicator, the rate of unemployment, provides a measure of the divergence between supply and demand at a point in time but has the disadvantage of being highly dependent on the self-reported job search of persons. Labor participation rates offer evidence on the available supply of labor but suffer from the same problem. Because the young move into and out of the work force more frequently than many other groups, the distinction between being unemployed and in the labor force or being out of the labor force is tenuous, making these rates potentially misleading indicators of the position of the young. The ratio of employment to population is a "harder" statistic as it reflects "objective" numbers: employment can be measured with establishment as well as household survey data. The disadvantage of the employment/population rate is that it can vary for reasons that have little to do with labor market "problems." With respect to other indicators, measures of the wages and type of job held by young persons are not as easy to interpret as the comparable measures for older workers due to the fact that the young seek employment for different reasons: to obtain short-term cash or for longer run career purposes. To the extent that wages on jobs that offer good future prospects are lower than those on other jobs, the usual measure of the value of employment, wages, can be misleading. For some purposes at least, it is important to obtain information on several characteristics of youth jobs, such as their permanent or temporary status, whether they have a "future," the extent of learning involved, as well as wage rates.

The various indicators of the position of the young in the market are, it should be stressed, interrelated. Decreases in the wages of the young are likely to increase employment; increased participation due to exogenous supply shifts will lower wages; and so forth. For this reason and because of the multifaceted nature of the employment relation, a variety of indicators of the youth labor market are examined in this section. The amount of labor is measured with the rate of unemployment, labor participation, weeks worked, and the employment to population ratio, with particular attention given the latter two statistics. Characteristics of jobs are measured by the broad industry and occupation of workers, which are associated with diverse employment characteristics, and by wages.

In addition to different indicators of labor market position, there are also several different surveys of persons which provide information on the young. The most widely used survey is the Current Population Survey of the U.S. Bureau of the Census, which obtains information by a random sample of over 50,000 households. Two other surveys which provide information on young workers are the National Longitudinal Survey of Young Men (NLS) and the National Longitudinal Survey of the High School Class of 1972 (NLS72).

These surveys follow individuals over time, whereas the CPS is primarily a cross-sectional survey. In this section we examine the picture of the youth labor market given by CPS data, leaving to section II the important issue of differences in statistics among the surveys.

Amount of Labor

Young workers have traditionally had higher rates of unemployment, lower rates of labor force participation, and lower employment/population ratios than other workers. While some of these differences reflect enrollment in school, even out of school youth have long exhibited lower rates of work. Figure 1 graphs the pattern of utilization rates over the post-war period for young men and young women and for young men not enrolled in school aged 16-17, 18-19, and 20-24 and gives the rates for youths predicted by regressions of their rates on those of "prime age men," aged 35-44. Deviations between the actual and predicted rates provide some indication of changes in traditional youth utilization patterns.

The figure highlights two important aspects of the young male employment problem in the United States. First, with respect to rates of unemployment, the pattern of residuals from the regressions reveals a distinct upward trend in youth rates relative to adult rates, particularly in the 1970's. Among 16-17 year old men, for example, actual rates of unemployment average about 3 percentage points above predicted in the 1970's compared to over 3-4 percentage points below predicted in the 1950's. Addition of a simple time trend to the regression of the rate of unemployment of the young on the rate of unemployment of older men yields the following estimated trend coefficients and standard errors (in parentheses):

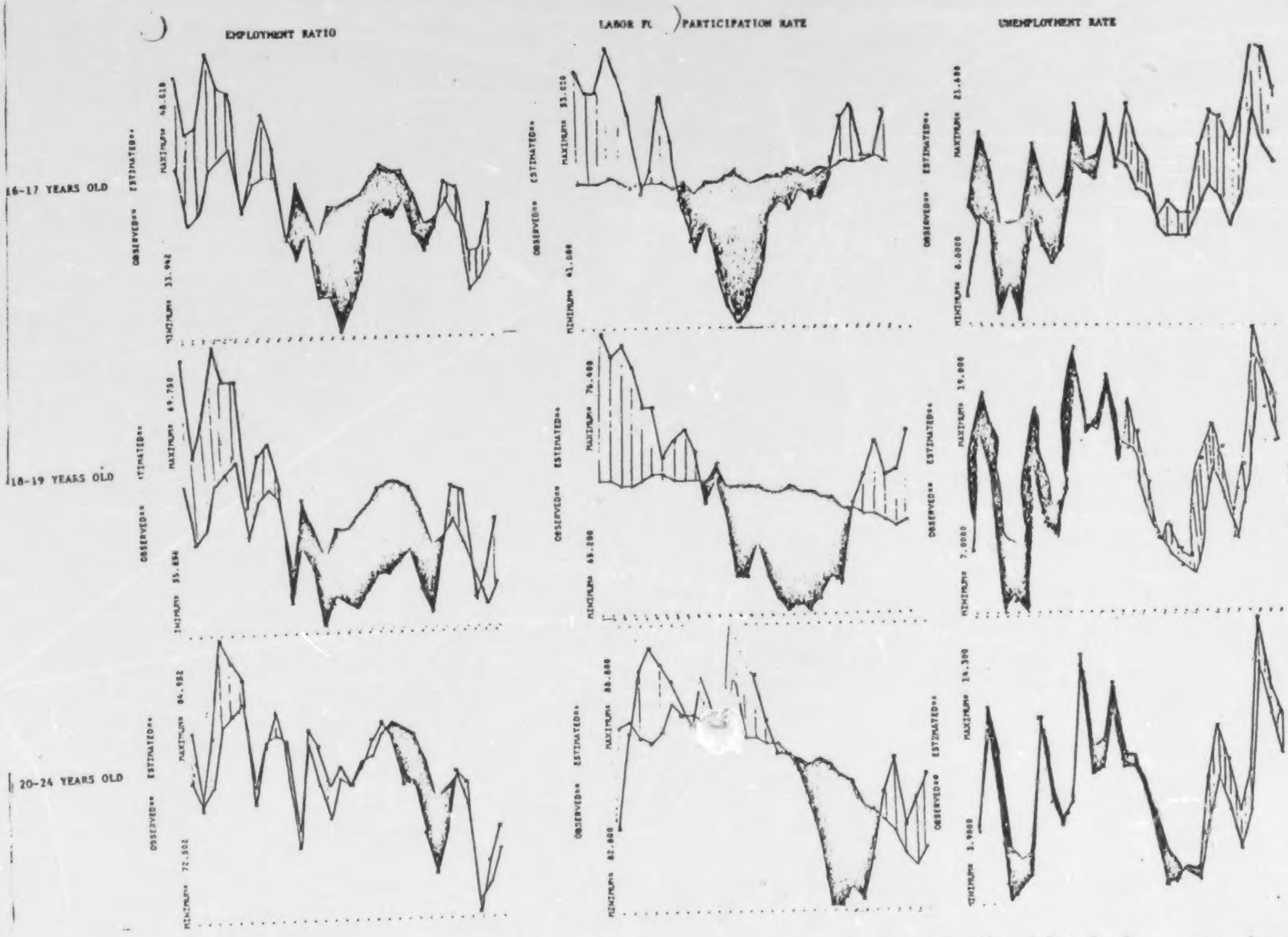
	Male	Female
16-17	.31 (.02)	.34 (.03)
18-19	.17 (.02)	.32 (.02)
20-24	.10 (.02)	.18 (.01)

Second, however, in contrast to the clear picture of change in unemployment rates, the figure tells a more mixed and uneven story about trends in participation and employment ratios. Among all young men (panel A) the participation of 16-17 and 18-19 year olds drops in the 1960's but rises in the 1970's, while the participation rate of 20-24 year olds varies only modestly throughout the period, giving an overall picture of stability in participation. Similarly, the employment/population ratios show increased rather than reduced labor market activity in the 1970's, following reductions in the 1960's, which runs counter to the picture of marked deterioration found in the unemployment data. The situation for out-of-school young men, on the other hand, shows a more definite pattern of deterioration, with participation and employment ratios trending downward and falling below the predicted ratios for much of the late 1960's and the 1970's. As far as can be told from these graphs, utilization of all young men did not worsen. markedly in the 1970's while that of the out-of-school group did.

The measures of the labor market position of women in panel C of the table show greater divergences between unemployment rates and participation and employment rates. Unemployment rises absolutely and compared to the rate predicted from the regression on the unemployment rate of prime age men. Employment and participation ratios, however, also rise, absolutely, and relative to the male rates, implying more rather than less utilization of teenage and young women workers.

In sum, while the rate of unemployment among the young shows a deterioration relative to older male workers, the employment ratios and

Figure 1: Utilization of Young Persons and Deviations of Utilization from Predicted Levels: Panel A - - ALL MALES

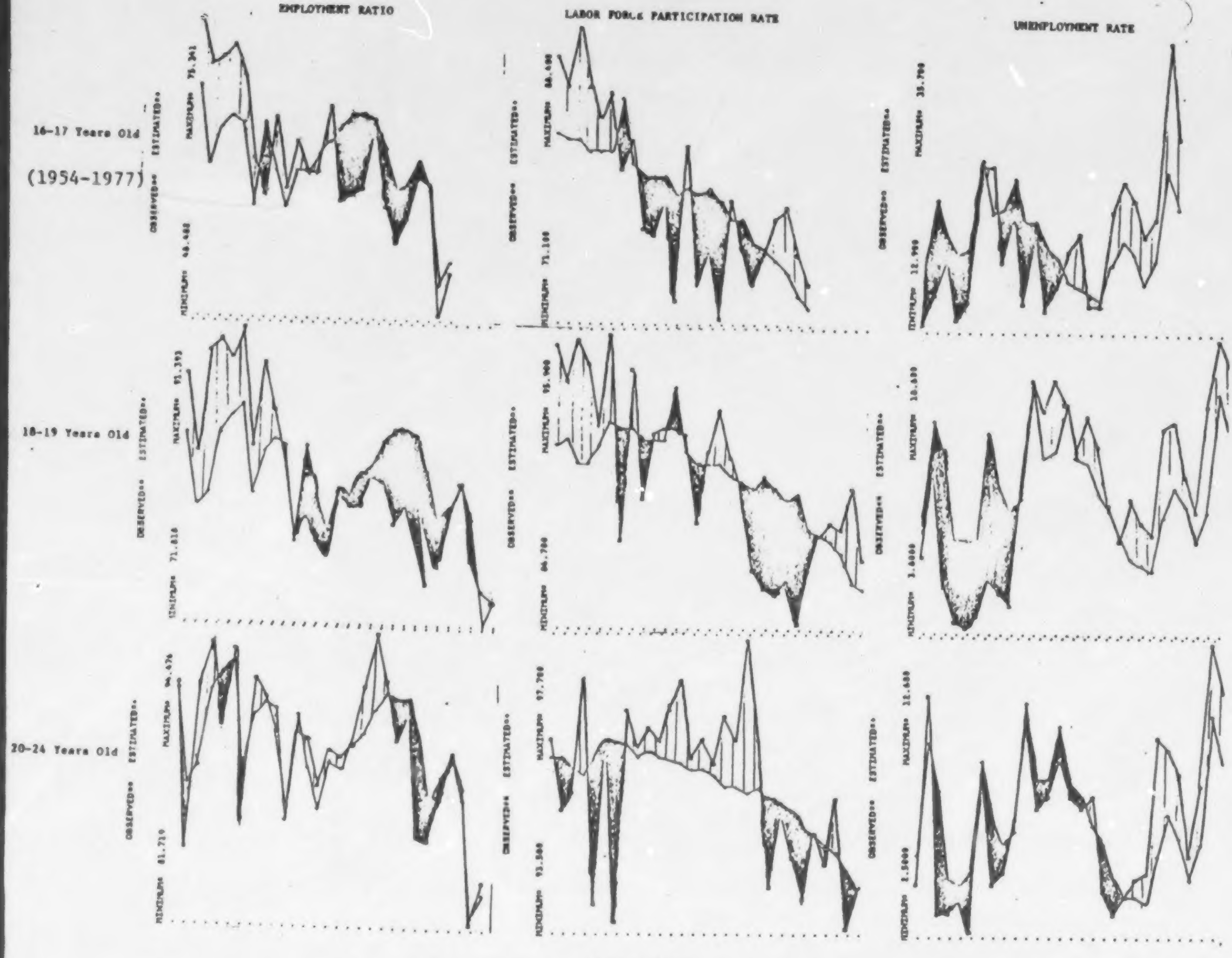


▨ below predicted
111 above predicted

1948-1977

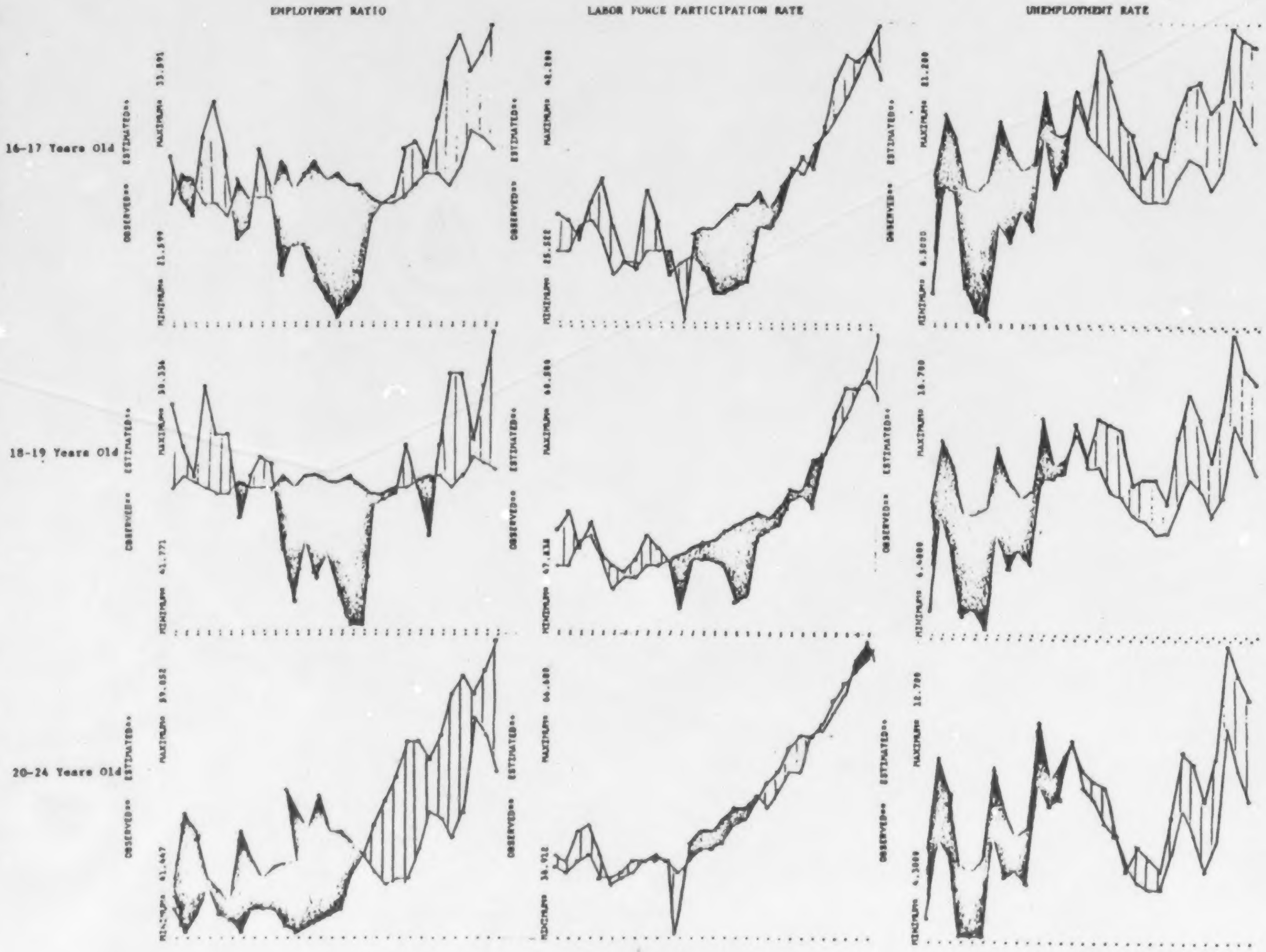
Source: Predicted levels from regressions listed in Appendix A.

Panel B - - OUT OF SCHOOL MALES



1948-1977

Panel C - - ALL FEMALES



1948-1977

participation ratios tell a different story, particularly for women. Overall, the data raise doubts about the existence of "job crisis" for all young workers.

Black Youth Joblessness

The absence of a definite deterioration in the employment of all young workers does not, however, mean that there is no youth employment crisis, but rather that the problem is more localized. Data on the employment, unemployment, and labor force of young workers by race from the Current Population Survey show a striking deterioration in the utilization of young blacks, which can be viewed as the essence of the youth employment problem in the U.S. This claim is documented by the evidence on the overall magnitude of employment and joblessness among black and other and white youth from the early 1950's to the 1970's given in table 1. First, the employment to population ratios given in line 1 for young men show a marked drop for blacks compared to the rough stability for whites. Among 16-17 and 18-19 year old black men, the ratios drop sharply from 1954 to 1964, stabilize in the late 1960's, and then drop sharply in the 1970's recession. Among 20-24 year old black men, the ratios hold steady until the 1970's, but then drop noticeably. Regressions linking the black employment ratios to those for comparably aged whites and a time trend make clear the extent of deterioration. The trend coefficients and standard errors (in parentheses) are: -.94 (.04), -.96 (.08), and -.25 (.11), for 16-17, 18-19, and 20-24 year olds, respectively. As a result of the downward trend in utilization, the ratio of black to white employment rates drops from rough equality with those of whites in the early 1950's to .43 (16-17 year olds), .57 (18-19 year olds) and .76 (20-24 year olds) by 1977.

The decline in the employment rate of young black men has two components: a marked rise in the fraction out of the labor force (line 2), which contrasts

Table 1

Dimensions of the Minority Black and Other Youth Employment Problem

	Black and Other Male				White Male			
	1954	1964	1969	1977	1954	1964	1969	1977
1. Percent with Job								
Age: 16-17	40.4	27.6	28.4	18.9	40.6	36.5	42.7	44.3
18-19	66.5	51.8	51.1	36.9	61.3	57.7	61.0	65.2
20-24	75.9	78.1	77.3	61.2	77.9	79.3	78.8	80.5
2. Percent in Labor Force								
Age: 16-17	46.7	37.3	37.7	30.8	47.1	43.5	48.8	53.8
18-19	78.4	67.2	63.2	57.8	70.4	66.6	66.3	74.9
20-24	91.1	89.4	84.4	78.2	86.4	85.7	82.6	86.8
3. Percent of Labor Force Unemployed								
Age: 16-17	13.4	26.0	24.9	38.7	13.9	16.1	12.5	17.6
18-19	15.2	22.9	19.2	36.1	12.9	13.3	7.9	13.0
20-24	16.7	12.6	8.4	21.7	9.9	7.4	4.6	9.3
4. Percent Without Work Experience								
Age: 16-19		(b)	32.7	55.3(a)		(b)	24.5	37.6(a)
20-24		9.7	12.8	20.8(a)		7.2	9.8	7.2(a)
	Black and Other Female				White Female			
5. Percent with Job								
Age: 16-17	19.8	12.4	16.8	12.5	25.8	23.6	30.3	37 5
18-19	29.6	32.9	33.7	28.0	47.2	43.1	49.1	54.3
20-24	43.1	43.8	51.6	45.4	41.6	45.3	53.3	61.4

Table 1 continued.

	Black and Other Female				White Female			
	1954	1964	1969	1977	1954	1964	1969	1977
6. Percent in Labor Force								
Age: 16-17	24.5	19.5	24.4	22.6	29.3	28.5	35.2	45.8
18-19	37.7	46.5	45.4	44.8	52.1	49.6	54.6	63.3
20-24	49.6	53.6	58.6	59.4	44.4	48.8	56.4	67.7
7. Percent of Labor Force Unemployed								
Age: 16-17	19.1	36.5	31.2	44.7	12.0	17.1	13.8	18.2
18-19	21.6	29.2	25.7	37.4	9.4	13.2	10.0	14.2
20-24	13.2	18.3	12.0	23.6	6.4	7.1		9.3
8. Percent Without Work Experience								
Age: 16-19		(b)	60.0	68.7(a)		(b)	38.7	36.4(a)
20-24		34.2	30.3	39.8(a)		34.4	25.9	21.5(a)

(a) Datum is for 1976.

(b) In 1964 49.6% of NW males, 41.6% of white males, 63.5% of NW females, and 56.1% of white females aged 14-19 had no work experience.

Sources: Lines 1, 2, and 3, 5, 6, 7, are based on figures from U.S. Department of Labor, Employment and Training Report of the President, 1978, Tables A-3, and A-14 (pp. 183-185 and pp. 202-204)

Liness 4 and 8 are based on figures from U.S. Department of Labor, Special Labor Force Reports Work Experience of the Population: 1976 (Table B-8, p. 20), 1969 (Table A-8, p. A-15), 1964 (Table A-8, p. A-11),

BLS Bulletins; the percentages for later years exclude those younger than 16.

with stable fractions for young whites; and an increase in the fraction in the labor force lacking jobs (line 3), which also occurs among whites. The relative importance of the two adverse developments can be gaged by decomposing the identity that links the employment (E) to population (P) ratio to the labor force (L) and to unemployment ($U = L-E$):

$$\text{(1)} \qquad E/P \equiv (L/P)(1-U/L)$$

or in log differential form:

$$\text{(2)} \qquad d\ln E/P \equiv d\ln L/P + d\ln (1-U/L)$$

For the period 1954-1977, equation (2) yields the following decomposition of the secular change in the employment to population ratio for young black men in the three age groups:

	16-17	18-19	20-24
$\Delta \ln E/P$	-.76	-.59	-.22
$\Delta \ln L/P$	-.42	-.30	-.15
$\Delta \ln (1-U/L)$	-.34	-.29	-.67

The drop in labor participation is, by these statistics, as or more important in the falling employment ratio than is the increased rate of unemployment. This implies that changes in unemployment rates *understate* the extent of the unemployment problem facing young blacks and that *the behavior of nonparticipants is critical to understanding the black youth employment problem.*

Line 4 of Table 1 examines the lack of employment among blacks from a different perspective: in terms of the fraction of young persons who obtain *no* work experience over a year. In contrast to the employment, labor force, and unemployment figures, which are based on monthly surveys of activity during a week, these figures are obtained from a retrospective question (on the March CPS) regarding activity over an entire year. What stands out is the marked increase in the proportion of blacks without work for a whole year: from 10 percent of 20-24 year old blacks in 1964 to 21 percent in 1976, which contrasts to the rough stability in the proportion of white men aged 20-24 without work experience.

Lines 5-8 present comparable figures for black and white women. While the employment to population and labor participation rates of young black women do not trend downward in absolute terms, they drop sharply relative to the rates for white women. In 1954, the ratio of black to white female employment rates were .77 for 16-17 year olds, .63 for 18-19 year olds, and 1.04 for 20-24 year olds. By 1977, the increased employment of white women brought the ratios down to .45, .52, and .74, respectively.

The marked deterioration in the relative employment of young black workers shown in Table 1 constitutes one of the major puzzles about the youth labor market in the United States and thus one of the prime questions for research: Why has the utilization of young black workers declined relative to that of young white workers?

The striking difference in the labor force participation of 16-24 year old blacks and whites in the 1970's, which accounts for much of the difference in employment/population ratios, is examined further in Table 2, which gives the percentage distribution of black and white young persons by various exclusive labor market categories in 1974-1975. Three basic differences between blacks and whites stand out in the table. First is the sizeable differential in the proportion of young persons working. In each age group the proportion of whites working exceeds that of blacks by upwards of 25 percentage points. From May 1974 to May 1975, when the economy entered a sizeable recession, the differentials increase noticeably for 18-19 and 20-24 year olds. Second is the extent to which the differentials are associated with differences in the fraction not in the labor force, as opposed to unemployed. In 1974, 82 percent of the 25.2 percentage point gap in the fraction working among 16-17 year olds is due to the fraction not in the work force; 85 percent of the 20.9 point gap among 18-19 year olds and 4.6 percent of the 9.0 gap among 20-24 year oldsare also associated with persons not in the labor force. The possibility that the labor force participation differences between young blacks and whites are due to differential propensities to enroll in school is, it should be stressed, rejected by the data. As can be seen in columns 7 and 8 of Table 2, even larger differences are found between blacks and whites out of school than are found in the overall population.

The differential patterns and trends in the employment of young blacks and whites are examined further in table 3, which treats the employment, labor force, and unemployment rates of out-of-school high school graduates and dropouts. Lines 1 and 2 deal with all 16-24 year old male high school graduates or dropouts while lines 3 and 4 treat males and females who either graduated or dropped out in the given year. The figures in lines 1 and 2 show that the percentage of black male high school graduates or dropouts with jobs is much below the percentages for comparable young white men and that the differentials grew sharply from 1964 to 1976, particularly in the 1970's, when black labor participation rates fell and unemployment rates rose. Lines 3 and 4 tell a similar story for persons in the relevant graduating class or dropout population. The magnitudes of some of the differences in 1976 are remarkable, to say the least. According to the CPS survey, only 39 percent of black high school graduates in the class of 1976 who were not enrolled in college were employed in October 1976 compared to 73 percent of their white peers; the black participation rate was 15 points below that for whites and the unemployment rate three times as high. Among dropouts only 22 percent of black youth compared to 49 percent of white youth were employed, with a 17 point difference in participation rates and twofold differential in unemployment rates.

Table 2: Percentage Distribution of Black and White Young Persons

by Labor Market Status: May 1973, 1974, and 1975[a]

	All Young Persons						Out of School Young Persons	
	May 1973		May 1974		May 1975		May 197	
Age and Status	Black	White	Black	White	Black	White	Black	White
16-17								
Working	14.5	37.9	13.2	38.4	11.9	36.1	34.1	66.8
Not Working	85.6	62.1	86.8	61.6	88.1	63.9	65.9	33.2
With Jobs[b]	0.8	1.3	0.3	1.3	1.2	1.7	0.0	2.1
Without Jobs	84.7	60.8	86.6	60.3	86.9	62.2	65.9	31.1
Have Looked	13.6	11.4	16.6	11.0	17.0	14.0	22.3	8.4
Available for Work and Looking[c]	9.5	6.6	9.5	6.2	9.6	8.0	19.4	7.5
Not Looking Actively	0.2	0.5	0.6	0.3	0.1	0.4	1.3	0.4
Not Available for Work[d]	3.9	4.2	6.6	4.6	7.2	5.6	1.6	0.4
Not in Labor Force	71.1	49.5	69.9	49.3	69.9	48.2	43.6	22.7
18-19								
Working	32.7	54.8	34.7	55.6	26.8	53.3	48.6	70.1
Not Working	67.3	45.2	65.3	44.4	73.2	46.7	51.4	29.9
With Jobs[b]	1.6	2.3	1.5	2.6	2.0	3.6	2.6	2.8
Without Jobs	65.7	42.9	63.7	41.8	71.2	43.1	48.7	27.1
Have Looked	16.7	10.4	15.1	10.9	22.1	14.1	16.5	9.2
Available for Work and Looking[c]	11.1	5.9	13.1	7.0	17.4	9.6	15.8	8.5
Not Looking Actively	0.3	0.2	0.3	0.2	0.7	0.3	2.5	0.2
Not Available for Work[d]	5.2	4.3	1.6	3.7	3.9	4.2	0.3	0.5
Not in Labor Force	49.0	32.6	48.7	30.9	49.1	29.0	32.3	17.8
20-24								
Working	54.8	65.0	57.0	66.0	47.6	62.9	62.0	72.2
Not Working	45.2	35.0	43.0	34.0	52.4	37.1	35.0	27.8
With Jobs[b]	2.8	2.8	3.3	3.5	4.3	4.9	3.5	3.5
Without Jobs	42.3	32.2	39.7	30.5	48.1	32.2	34.4	24.3
Have Looked	12.3	6.2	11.3	6.3	17.4	9.2	11.0	5.0
Available for Work and Looking[c]	10.8	4.4	9.7	4.5	16.1	7.3	9.6	4.4
Not Looking Actively	0.3	0.1	0.9	0.2	0.7	0.3	1.0	0.4
Not Available for Work[d]	1.2	1.7	0.8	1.5	0.7	1.6	0.4	0.2
Not in Labor Force	30.0	26.0	28.4	24.3	30.7	23.0	23.4	19.2

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a). Based on weighted counts with the appropriate Current Population Surveys.

b) Includes employed workers not working because of illness, vacation, bad weather, or labor dispute, and unemployed workers [illegible]porary or indefinite layoff or about to start a new job.

c) Includes job losers, job quitters, [illegible]ers who left school and those wanting temporary work.

d) Includes people who already have jobs, and those unavailable because of school or temporary illness.

Table 3

Employment of High School Graduates and Dropouts

	Blacks and Other Races			Whites			
	1964	1969	1976	1960	1964	1969	1976
1. All male high school graduates not enrolled in college 16-24[a]							
a. Percent with a job	75.8	81.6	67.3		86.5	88.1	87.0
b. Percent in labor force	93.3	91.5	86.1		94.9	93.8	95.4
c. Percent of labor force unemployed	18.8	11.3	22.0		8.9	6.0	8.9
2. Male high school dropouts 16-24[a]							
a. Percent with a job[b]	70.3	72.7	50.4		76.1	74.7	71.1
b. Percent in labor force	85.8	83.0	73.6		88.1	83.7	88.5
c. Percent of labor force unemployed	18.1	12.4	31.5		13.6	10.8	19.7
3. Male and female high school graduates in reported year not enrolled in college							
a. Percent with a job	52.3	50.0	39.0	67.0	64.6	73.4	72.9
b. Percent in labor force	81.1	72.6	70.3	77.0	77.5	80.2	85.9
c. Percent of labor force unemployed	35.6	31.2	44.5	13.0	16.7	8.5	15.1
4. Male and female school dropouts							
a. Percent with a job	49.3	49.3	21.6	48.7	39.2	52.1	48.6
b. Percent in labor force	63.4	62.7	50.9	59.7	52.8	60.9	67.1
c. Percent of labor force unemployed	22.2	21.3	56.9	18.4	25.7	15.5	27.5

[a] All figures are taken from Employment of High School Graduates and Dropouts, 1960 (Table 2, p. 465), (Table A, p. A-5); 1964 (Table 1, p. 639, Table 4, p. 642); 1969 (Table 2 and Table 3, p. 39); 1976 (Table 3, p. A-13, Table K, p. A-18).

[b] 1960 figures in line 2 and line 3 include female graduates as well as male graduates.

[a] [illegible] figures in line 2 include male graduates ages 16-21.

Because a sizeable proportion of black/white differences in youth employment result from differences in labor force behavior, it is important to examine the position of nonparticipants from the Current Population Survey. The table records the percentage of 16-19 and 20-24 year old nonparticipants in and out of school and the percentage of these 20-24 year old nonparticipants in and out of school and the percentage of these groups who report that they do or do not want a job in the survey week and their activity or reason for not seeking employment. For men, the data suggest that most nonparticipants, including those out of school, do not in fact want a job in the survey week, but does not elucidate the reasons why they are not seeking work. Two-thirds of 16-19 year old out of school male participants do not want a job for "other" (unknown) reasons while half of 20-24 year old out of school male nonparticipants are also reported as not wanting a job for "other" reasons. Even among 16-19 year old women, the proportion who do not want a job for "other reasons" is about one-third. Among 20-24 year olds, however, it is clear that choice of household activities leads persons to be out of the work force.

The figures in columns 5 and 6 of the table show a much higher proportion of out-of-the labor force blacks actively wanting a job now but "discouraged" because they think they cannot get a job or for "other reasons." Thirty-six percent of out of school 16-24 year old black nonparticipants desire a job compared to 19 percent of their white peers. While inclusion of women in the data by race makes keeping house the main reason for not wanting a job now, one-quarter of both black and white groups do not want a job for "other reasons."

The sizeable differences in labor participation rates between young blacks and whites, the declining rate of participation among young blacks, and the lack of information about not enrolled nonparticipants directs attention to a second

Table 4

Distribution of Nonparticipants in the Labor Force,
by school status and desire for work, 1977

	Male Workers		Female Workers		Both Sexes	
	Age 16-19	Age 20-24	Age 16-19	Age 20-24	White Age 16-24	Black and Other Age 16-24
Total, Out of Labor Force	100.0	100.0	100.0	100.0	100.0	100.0
In school	80.8	71.1	67.6	23.5	58.9	60.3
want a job now	21.4	15.7	19.6	16.2	18.3	23.6
do not want a job now	78.6	84.3	80.4	83.8	81.7	76.4
Out of school	19.2	28.9	32.4	76.5	41.1	39.7
want a job now but						
ill, disabled	27.1	34.6	22.5	18.7	18.7	35.7
think cannot get job	1.3	6.3	.9	.9	1.4	1.3
household responsibility	1.3	12.2	6.9	3.6	4.8	11.6
other reasons	14.5	16.1	7.7	9.3	5.5	12.9
			7.0	4.9	7.1	9.9
do not want a job now	72.9	64.3	77.5	81.2	81.3	64.3
ill, disabled	3.8	15.6	1.5	2.4	3.3	3.9
keeping house	2.4	1.0	43.9	71.4	53.2	35.3
other	66.7	48.7	32.2	7.4	24.8	25.1

Source: U.S. Department of Labor, Employment and Earnings, Vol 25, No.1 Survey 1978
Table 39, p. 167
Table 40, p. 168

major research question whose answer is needed to understand the youth labor market problem in the United States: What are the out-of-the-labor-force youth doing and why have they left the work force?

While much of the difference between the employment of young black and white workers is associated with differences in labor force participation, there are also sizeable racial differences in the proportion of young persons available for work and looking, particularly in the older age groups. According to table 2, 13.1 percent of 18-19 year old blacks, for example, were available and looking in 1974 compared to 7.0 percent of 18-19 year old whites while 9.7 percent of 20-24 year old blacks were looking compared to 4.5 percent of 20-24 year old whites.

Table 5 presents data designed to illuminate this differential. It records the proportion of black and white labor force unemployed for several "direct" reasons: loss of job; quits; entrance into the labor force, divided between re-entrants, defined as those who previously worked at a full-time job lasting 2 weeks or longer but who were out of the labor force prior to beginning to look for work, and new entrants, defined as persons who never worked at a full-time job lasting 2 weeks or longer. The figures direct attention to two factors in the high unemployment rate of black youngsters: difficulty in obtaining an initial job upon entry to the work force, which is the prime cause of black/white differences among 16-17 year olds and 18-19 year olds; and loss of jobs, which explains the bulk of differences among 20-24 year olds.

The differences in the proportion of black and white teenagers who are unemployed entrants are remarkable. In 1969 11.0 of the 12.1 percentage point difference between the unemployment rate of 16-17 year old blacks and whites was attributable to entrants; 5.5 points of the 10.9 percentage point differential between 18-19 year olds was also due to entrants; in 1978, the relevant differences were 25.3 of 25.6 points (16-17 year olds) and 14.5 of 20.1 points (18-19 year olds). By contrast differential rates of job leaving had very little impact on the

Table 5 Direct Causes of Youth Unemployment[a]

[illegible]	Black 1969	Black 1975	Black 1978[b]	White 1969	White 1975	White 1978[b]
16-17						
Total Unemployment Rate	24.6	39.2	46.4	12.5	19.7	19.7
losers	2.1	4.8	4.5	1.6	3.4	3.2
leavers	1.6	1.1	1.4	1.0	1.4	1.2
total entrants	20.9	33.9	40.6	9.9	15.0	15.3
re-entrants	10.2	15.3	15.7	4.3	5.9	6.1
new entrants	10.7	18.5	25.1	5.6	9.0	9.2
18-19						
Total Unemployment Rate	18.8	32.9	33.5	7.9	17.1	13.4
losers	5.9	13.0	10.2	2.0	8.1	5.4
leavers	3.3	2.3	2.6	1.5	1.7	1.8
total entrants	10.0	17.9	20.7	4.5	7.2	6.2
re-entrants	7.0	10.1	10.6	3.0	4.3	3.7
new entrants	3.0	7.5	10.2	1.5	3.0	2.5
20-24						
Total Unemployment Rate	8.4	23.0	22.8	4.6	13.2	10.7
losers	3.9	14.9	11.4	1.8	8.6	6.2
leavers	1.7	1.4	1.6	0.9	1.4	1.9
total entrants	2.7	6.7	9.8	1.9	3.2	2.6
re-entrants	1.8	4.8	7.3	1.7	2.7	2.2
new entrants	0.9	1.9	2.5	0.3	0.5	0.4

Notes: a. Unemployment weighted counts are taken from unpublished data provided by BLS. Labor Force numbers are taken from *Employment and Training Report of the President, 1977*, [illegible] (p. 139-193).

b. 1978 percentages are [illegible] averages of percentages for the first three months of 1978.

overall differential while rates of job loss have only a slight effect on the difference in unemployment rates by race among 16-17 year olds and a moderate effect on the differences in unemployment rates by race among 18-19 year olds.

The high fraction of young black labor force participants in the entrant and unemployed category could be due to one of two factors: an especially large number of black entrants or an especially high rate of unemployment among entrants. That the problem is one largely of inability to find a job upon entry rather than a high re-entry rate can be seen by comparing black and total entry rates, defined as the fraction of persons who have entered the labor force in a month relative to the number in the labor force. For blacks, Clark and Summers report (p. 6) a rate of flow from out of the labor force into the labor force of .19, which given a ratio of labor force to nonlabor force participants of about 1 to 1 for the group, yields an entry force of .19. For total men, Clark and Summers report a rate of flow from out of the labor force into the labor force of .21 which, at a ratio of nonlabor force participants of about 2 to 3 gives an entry rate of .14(= .21 x 2/3). The 5 percentage point differential in entry rates falls far short of the 10 to 25 point differential rate of unemployment among new entrants in table 5. More direct evidence from Clark and Summers on the probability that new entrants obtain jobs immediately upon entry confirm the interpretation of table 5 in terms of the difficulty that blacks have in finding jobs: according to their data (p. 9) 51% of blacks compared to 36% of whites move from out of the labor force to unemployment, as opposed to employment.

Finally, it is important to note that the increased rate of unemployment among young blacks from 1969 to 1978 can be attributed to increased unemployment among new entrants and increased unemployment due to losses of jobs:

	Change in Unemployment	Change in Losers Rate	Change in Entrants Rate
16-17	21.8	2.4	19.7
18-19	16.7	4.3	10.7
20-24	14.4	7.5	7.1

In short, the evidence on direct causes of unemployment suggests that failure to obtain a job rapidly upon entrance into the market and a high job loss rate constitute major labor market problems for black youngsters, raising additional questions regarding the youth labor market problem: *Why do young blacks have greater problems in finding a first job than young whites? Why are young blacks laid off more frequently than young whites?*

Characteristics of Employment

The labor market position of workers depends not only on whether they hold a job or not but also on the type of job and rate of pay. In this section we compare the industrial and occupational distribution of young and all male workers, the percent of young and all workers with part-time as opposed to full-time positions, and the earnings of young and all workers. The data show that the young are concentrated in a different set of jobs than other workers, are especially likely to work part-time, and have experienced sizeable declines in relative earnings in the period studied.

Evidence on the industrial and occupational position of young and all male workers is given in Table 6, which records percentages employed in one-digit industries and occupations from the decennial Censuses of Population and from Current Population Surveys. The divergence between the employment distributions of young and all workers is summarized with an *Index of Structural Differences*, defined as the sum of the absolute values of the percentage point differences between the groups, formally, if α_{ij} is the percentage of workers in age group i in the jth category and $\alpha_{.j}$ is the percentage of all workers in the category, the index is defined as $\sum_j \alpha_{ij}-\alpha_{.j}$.

The industry employment figures reveal an enormous difference between the sectors of employment of 16-17 year old men and all male workers, a sizeable difference between the industries hiring 18-19 year olds and all men but only a modest difference between the industrial distribution of 20-24 year olds

Table 6: The Industrial and Occupational Distribution of the Employment of Young and All Male Workers, 1950-1977
Panel A: *Census of Population*

	1950				1960				1970			
	16-17	18-19	20-24	Total^(a)	16-17	18-19	20-24	Total^(a)	16-17	18-19	20-24	[illegible]
INDUSTRIES												
Agriculture	39.2	24.5	15.0	15.9	18.1	11.8	7.4	9.0	8.8	5.7	3.8	[illegible]
Mining	.5	1.5	2.3	2.2	.2	.8	1.2	1.6	.2	.7	1.1	[illegible]
Construction	6.0	6.6	8.0	8.2	3.5	6.9	8.4	8.4	3.5	6.5	8.4	[illegible]
Manufacturing	15.0	26.5	30.0	27.0	15.5	25.5	32.6	30.2	13.1	25.7	31.0	[illegible]
Transp., etc.	2.4	5.1	8.9	9.2	3.9	3.8	6.6	8.5	2.0	4.8	7.7	[illegible]
Trade	23.7	22.6	18.8	17.1	40.5	29.3	19.6	17.0	52.5	37.0	21.3	18.9
Finance	.5	1.6	2.0	2.8	.8	1.7	2.8	3.4	1.1	1.7	3.7	4.0
Bus & Repair	1.8	2.5	3.4	3.0	2.9	3.5	3.3	2.9	3.8	3.9	3.9	3.6
Pers. Service	2.9	2.6	2.4	2.9	4.3	2.8	2.1	2.5	3.6	2.2	1.8	2.1
Ent. & Rec.	4.4	2.0	1.2	1.0	3.5	1.6	.9	.8	3.2	1.7	1.0	.9
Prof. & Rel.	1.6	4.4	3.5	4.8	3.6	5.4	6.8	6.9	7.2	9.2	12.0	10.4
Public Admin.	.4	.9	3.2	4.6	.4	1.3	3.3	5.3	1.0	.1.9	4.2	6.1
Not Reported	3.4	1.7	1.4	1.3	4.7	5.7	5.1	3.6				
ISD^c	68.9	27.5	10.8		74.3	34.9	12.1		82.1	38.3	10.4	
OCCUPATIONS												
Prof, Tech. & kindred	.5	2.1	5.5	7.3	1.3	3.3	9.8	10.3	1.7	4.2	14.5	14.4
Farmers & managers	2.7	3.6	5.6	10.4	1.8	1.7	2.0	5.5	.4	.5	.9	2.8
Managers ex farmers	.5	1.2	3.4	10.5	.5	1.3	3.8	10.6				
Clerical	6.8	9.4	9.4	6.5	7.8	11.3	10.3	7.0	.7	1.6	4.9	11.2
Sales	10.7	7.5	6.9	6.4	13.8	7.8	6.2	6.9	7.9	11.4	11.0	7.6
Craftsmen & Foremen	3.4	8.1	14.9	18.7	4.6	10.1	15.4	19.5	9.3	6.7	6.2	6.9
Operatives	15.9	25.8	28.1	20.1	18.5	26.0	26.5	19.9	5.6	12.4	18.5	21.2
Private household	.2	.1	.1	.2	.5	.2	.1	.1	18.1	26.7	24.1	19.5
Service ex PHH	9.7	6.0	4.6	5.9	11.5	8.0	5.6	6.0	.3	.1	.1	.1
Farm laborers	35.7	20.0	8.6	4.9	14.7	8.8	4.4	2.7	24.8	14.1	8.1	8.0
Laborers ex farm & mine	13.0	14.5	11.5	8.1	19.1	14.2	9.4	6.9	7.0	4.1	2.1	1.7
Not Reported	2.6	1.7	1.3	1.1	5.8	7.3	6.6	4.6	24.1	18.1	9.3	6.6
ISD^c	89.5	63.3	37.4		76.9	56.3	29.9		85.1	61.1	21.8	

[a] Males 14 years and older

[b] Males years and older

[c] ISD = Index of structural differences, defined as sum of absolute deviations between percentages for young workers and for older workers

Source: Census data: *Industrial Characteristics*, 1950, Table 3; 1960, Tables 2, 4; 1970, Tables 32, 34. Occupational Characteristics, 1950, Table 6; 1960, Table 2, 6; 1970, Tables 39, 40.

Table 6: The Industrial and Occupational Distribution of the Employment of Young and All Male Workers, 1950 1977
Panel B: Current Population Survey^a

	1967				1974				1977			
INDUSTRIES	16-17	18-19	20-24	Total$^{(b)}$	16-17	18-19	20-24	Total$^{(b)}$	16-17	18-19	20-24	Total$^{(b)}$
Mining	.1	.6	.9	1.2	.2	.9						
Construction	5.6	8.5	8.5	9.8	7.4	10.9	1.3	1.2	.1	1.1	1.7	1.5
Manufacturing	14.0	31.6	39.9	34.3	12.2	29.4	12.0	10.4	6.9	11.8	12.1	10.1
Transp., etc.	2.4	5.1	7.2	8.9	2.3	5.2	30.8	30.0	11.8	22.9	28.2	26.4
Trade	53.4	34.6	19.8	18.9	55.4	34.1	8.0	9.1	2.5	4.5	6.9	2.9
Finance	1.6	1.5	3.1	4.2	1.4	1.9	23.0	19.8	38.6	38.7	25.9	20.4
Bus & Repair	3.8	3.1	3.7	3.4	4.9	4.4	3.8	4.6	1.4	1.7	3.3	4.5
Pers. Service	2.9	2.0	2.0	2.1	2.7	1.6	4.3	4.0	3.8	5.2	5.2	4.4
Ent. & Rec.	5.1	2.6	1.1	1.0	4.2	2.3	1.5	1.7	1.9	1.7	1.6	1.6
Prof. & Rel.	9.3	8.0	9.8	9.6	7.8	7.4	1.6	1.1	4.8	2.7	1.8	1.7
Public Admin.	1.9	2.6	4.0	6.6	1.5	1.9	11.0	11.5	6.8	8.3	9.9	12.5
Not Reported							6.2	6.6	1.4	1.6	3.5	6.5
ISD^c	79.3	35.0	14.2		81.2	32.8	11.5		84.2	44.6	18.1	

OCCUPATIONS	16-19	Total$^{(b)}$	16-19	Total$^{(b)}$	16-19	Total$^{(b)}$
Prof, Tech. & kindred	3.3	13.0	2.4	13.6	2.0	14.6
Farmers & managers	.5	3.9	.5	3.0	.3	13.9
Managers ex farmers	.6	13.3	1.4	13.6	1.3	2.5
Clerical	9.5	7.2	6.5	6.6	6.4	6.3
Sales	7.0	5.5	3.8	6.1	6.3	6.0
Craftsmen & foremen	6.7	20.1	10.9	20.8	10.7	20.9
Operatives	23.3	20.4	22.1	18.8	20.0	17.6
Private household	.3	.1	.2	.0	.4	.1
Service ex PHH	14.5	7.0	18.3	7.9	22.0	8.7
Farm laborers	9.4	2.2	7.5	1.8	6.5	1.7
Laborers ex farm & mine	22.4	7.2	24.3	7.7	24.1	7.6
Not Reported						
ISD^c	77.8		72.4		75.3	

[a] CPS excludes agriculture and private household workers

[b] Males 16 years and older

[c] ISD = index of structural differences, defined as sum of absolute deviations between percentages for young workers and for older workers

Source: CPS data: Industrial Characteristics, 1950, Table 3; 1960, Tables 2, 4; 1970, Tables 32, 34. Occupational Characteristics, 1950, Table 6; 1960, Tables 2 4; 1970, Tables 39, 40.

and all men. Both the Census data and the CPS data (which are limited to nonagricultural industries) show 16-17 year olds to be largely concentrated in trade and substantially underrepresented in manufacturing, among other sectors. From 1950 to 1970 the employment of 16-17 year olds as well as other men in agriculture dropped sharply. Men in the next age bracket, 18-19 year olds, are also relatively overrepresented in trade but much less so than 16-17 year olds. The 18-19 year olds tend to find a relatively large number of jobs in manufacturing. Overall, the index of structural differences is reduced by about 50% as the group increases in age from 16-17 to 18-19. In contrast to teenage groups, the industrial distribution of 20-24 year olds closely mirrors that of all male workers, suggesting that by that age the young are beginning to enter what may be called adult job markets. From 1974 to 1977, however, the ISD grew for 20-24 year olds, as well as for the teenagers.

Divergences in job distributions are considerably greater along occupational dimensions, with 16-17 year olds highly concentrated in laborer and service jobs and 18-19 year olds in laborer, service, operative and clerical jobs. For 20-24 year olds, the divergences are smaller and appear to have fallen from 1950 to 1970.

Whether the marked difference in the industrial and occupational distribution of employment of teenagers and all male workers does, in fact, reflect differences in job markets depends, of course, on the link between the jobs obtained by the teenagers and adult jobs. The wide divergences shown in Table 6 are, at the least, suggestive of significant differences between the teenage and adult job markets.

The data on part-time versus full-time work given in Table 7 lends some support to the separate market interpretation of the divergences in job distributions. According to the table, nearly half of teenage workers and over 3/4ths of those aged 16-17 are either employed part-time or are on part-time schedules. By contrast, the proportions of all workers employed part-time and on part-time schedules is much smaller. Among the unemployed

Table 7

The Distribution of Youth and All Workers, by Part-Time Job Status, 1976

	Percentage of Employed Working Part-Time	Percentage of Unemployed Seeking Part-Time Work	Percentage on Full-Time Schedules
16-19			
Male and Female	46.4	41.9	
Total			
Male and Female	14.3	19.4	
Nonagricultural Male Employees			
All			10.6
16-17			76.4
18-24			20.9
Nonagricultural Female Employees			
All			28.8
16-17			84.4
18-24			29.0

Source: U.S. Department of Labor, Handbook of Labor Statistics 1977
Tables 20, 21, pp. 63-67

over 40% of unemployed teens are seeking part-time jobs compared to less than 20% of all unemployed workers. To the extent that the markets for full-time and part-time workers are at least reasonably separable, these figures support the contention that there are substantive differences between the youth, especially the teen, and adult job markets.

Wages

On the price side of the youth labor market, two major developments stand out: a sharp drop in the relative earnings of young workers in the period under study; and an increase in the earnings of young blacks compared to young white workers. Columns 1-2 of table 8 document the marked fall in the relative earnings of the young in terms of the ratio of usual weekly earnings of out of school white men aged 16-24 to the usual weekly earnings of all white men 25 and over. These data are taken from the May Current Population Survey, which provides the best CPS figures on rates of pay from 1967 to the present. The data show drops in the rates of earnings for each age group on the order of 10 points or so. Corroboratory information on the annual earnings of year round and full-time workers from the March CPS reveals similar patterns of change (see Freeman, 1978): a twist in the age-earnings profile against young workers. Because a fairly sizeable number of young persons are employed part-time, columns 3 and 4 of the table record the ratio of the earnings of part-time young white men to the earnings of full-time workers. All but two of these earnings ratios drop, though by a smaller magnitude than the ratios for full-time workers, presumably because of their initially low levels. If the full-time and part-time workers are joined into a single group, the deterioration in the earnings position of the young becomes even more marked. This is because the fraction of 16 to 24 year old out of school men working part-time doubled over the period covered from 8% to 16% in 1977.

Table 8

Percentages of the Median Usual Weekly Earnings of Out of School Men to Workers Aged 25 and Over, by Race 1967-77

	Earnings of Full-Time Young White Men/ Earnings of Full-Time White Men, 25+		Change in Earnings Ratios	Earnings of Part-Time Young White Men/ Earnings of Full-Time White Men, 25+		Change in Earnings Ratios	Earnings of Full-Time Black Workers/ Earnings of Full-Time White Men, 25+		Change in Earnings Ratios
Age	1967	1977	1967-77	1967	1977	1967-77	1967[b]	1977	1967-77
16	.38	.34	-.04	.19	.14	-.05	.33	.32	-.09
17	.49	.39	-.10	.21	.19	-.02	.39	.32	-.07
18	.54	.49	-.10	.22	.20	-.02	.44	.44	
19	.61	.52	-.09	.22	.24	.02	.42	.43	-.01
20	.66	.58	-.08	.35	.26	-.09	.63	.52	-.11
21	.73	.61	-.12	.22	.23	.01	.57	.50	-.07
22	.79	.63	-.16	.41	.24	-.17	.59	.54	-.05
23	.84	.71	-.13	.38	.32	-.06	.59	.54	-.05
24	.87	.75	-.12	.37	.26	-.11	.60	.63	-.03

Source: U.S.Department of Labor, Unpublished Tablulations from May 1967 and May 1977, Current Population Survey

1967 refers to voluntary part-time unless out of school
1977 refers to all part time workers

[b] No whites in 1969

exacerbating the drop in relative earnings.

Finally, the last two columns in table 8 reveal a pattern of drops in the earnings of young blacks relative to full-time white male workers of a smaller magnitude than those obtained for young white men, indicative of an improvement in the earnings of young blacks vis-a-vis young whites. This contrasts with the worsened employment record of young blacks relative to young whites, possibly indicative of movement along a relative demand schedule.

Summary

The evidence from the Current Population Survey on the labor market position of young workers in this section has yielded several findings regarding the changing market for the young. We have found: that the unemployment rate of all young workers deteriorated relative to older workers; that, by contrast, the employment to population ratio did not decline, except for not enrolled young men; that all indicators of employment -- unemployment rates, labor participation rates, and employment/population rates -- show a worsened labor market position for young blacks while, by contrast, their relative earnings position improved; that a large proportion of the drop in black employment is associated with nonparticipation in the work force, about which relatively little is known; that much of black unemployment is due to problems in finding a first job and much to job loss; that the occupational and industrial distribution of teenage employment diverges sharply from that of adult males, suggesting a reasonably distinct job market, while the distribution of jobs of 20-24 year old men is quite similar to that of all men; that relatively many teenagers are part-time employees; and that the relative earnings of young workers have dropped sharply in the period studied.

II Associated Social Problems (Preliminary)

Concern with youth unemployment arises in part for two basic reasons: fear that initially high rates of joblessness among the young will have long term consequences for the economic well-being of the young; fear that youth unemployment is associated, perhaps causally, with related major social problems, such as youth crime, drug abuse, and the like. The potential long term effect of youth unemployment has been examined by Ellwood. This section focuses on the second issue. It presents data on several social problems relating to youth that are a priori linked with joblessness and then examines the link itself. The evidence suggests a significant worsening in these 'related social problems' which deserves serious attention.

The social problems

1. Increased youth crime

Tables 9 and 10 demonstrate that youth arrest rates for both violent crimes and property crimes have risen dramatically since the mid-1960's. This appears to be true for black and white youth, although the changes in rates are substantially higher for blacks.

2. Violence in school

Table 11 shows sharp increases in violence and disruption in school from 1964 to 1968 and from 1970 to 1973. Over the same periods school enrollments rose much more modestly.

3. Increased illegal births

As can be seen in table 12, the number of births to unmarried women aged 15-19 has risen among whites and nonwhites.

The preceding social statistics reveal substantial changes in several important social indicators regarding youth. While cause and effect are difficult to unentangle, the increase in suicide, illegitimacy, violence in school, and youth crime are undoubtedly linked to the labor market problems of the young. We plan to investigate these links in the next few months.

4. Increased youth suicide rates

Table 13 documents a sharp rise in the suicide of young nonwhite and white youth from 1950 to 1976, which compares with rough stability in the suicide rate of the entire population. In 1950 the suicide rate for 20-24 year old nonwhites and for 20-24 year old whites were below the population average. In 1976 both suicide rates exceeded the population average.

Table 9: Teenage Crime -- Annual Arrests per Thousand Population

	1950	1955	1965	1970	1975
All arrests					
all ages	5.3	11.3	26.0	32.3	37.6
under 21[a]	2.1	5.0	20.0	31.9	42.7
Violent crimes[b]					
all ages	.6	.3	.8	1.2	1.7
under 21	.3	.2	.6	2.2	1.9
Property crimes[c]					
all ages	.9	.9	3.5	5.1	7.2
under 21	.8	1.5	6.0	8.8	12.9

a) 1950 population aged 20 estimated as one fifth the population aged 20 to 24.
b) Includes murder, non-negligent homicide, rape, robbery, and aggravated assault; includes negligent homicide in 1950.
c) Includes burglary, larceny and auto-theft.

Number of arrests from U.S. Federal Bureau of Investigation, Uniform Crime Reports for the United States, XXI (1950),2,pp.110-111, XXVI (1955), pp. 113-114, XXXVI (1965), p. 114, XLI (1970), p. 128, XLVI (1975), p. 190.
Population figures from U.S. Bureau of the Census, Statistical Abstract of the United States, 72 (1951), p. 10, 77 (1956), p. 26, 87 (1966), p.8, 97 (1976), p. 27.

Table 10: Teenage Crime Across Races — Annual Arrests per Thousand Population

	Whites			Blacks[a]		
	1965	1970	1975	1965	1970	1975
All arrests						
all ages	13.9	24.6	29.9	65.3	74.8	79.1
under 18	12.2	18.4	27.3	27.8	38.9	45.4
Violent crimes[b]						
all ages	.3	.5	.9	3.0	5.1	6.3
under 18	.1	.3	.6	1.5	2.9	4.0
Property crimes[c]						
all ages	2.5	3.6	5.4	9.0	14.2	17.6
under 18	4.0	5.3	9.0	11.0	15.6	19.6

a) All non-whites in 1965.
b) Includes murder, rape, robbery, and aggravated assault.
c) Includes burglary, larceny, and auto-theft.

Number of arrests from Uniform Crime Reports, XXXVI (1965), pp. 117-118, XLI (1970), pp. 131-132, XLVI (1975), pp. 192-193. Population figures from same source as above.

Table 11

Violence and Disruption in the Schools

Percentage Increase in Crime in Schools in 110 Urban School Districts, 1964-1968

Category	1964	1968	Percentage Increase
Homicide.	15	26	73
Forcible Rape	51	81	61
Robbery	396	1,508	376
Aggravated Assault.	475	680	43
Burglary, Larceny	7,604	14,102	85
Weapons Offenses.	419	1,089	136
Narcotics	73	854	1,069
Drunkenness	370	1,035	179
Crimes by Nonstudents	142	3,894	2,600
Vandalism Incidents	186,184	250,549	35
Assault on Teachers	25	1,081	7,100
Assault on Students	1,601	4,267	167
Other	4,796	8,824	84

Source: Senate Subcommittee on Juvenile Delinquency Survey, 1970, reported in J. M. Tien, Crime/Environment Targets.

Percentage Increase in Crime in Schools in 516 School Districts, 1970-1973

Category	Percentage Increase
Homicide	18.5
Rape and Attempted Rape	40.1
Robbery	36.7
Assault on Students	85.3
Assault on Teachers	77.4
Burglary of School Buildings	11.8
Drug and Alcohol Offenses on School Property	37.5
Weapons Confiscated	54.4

Source: Our Nation's Schools..., Preliminary Report of the Senate Subcommittee to Investigate Juvenile Delinquency, 1975.

Table 12:

Fertility Rates: 1955-1976: Unmarried Women

15-19 Years Old

Births per 1,000 Unmarried Women

YEAR	WHITES	NONWHITES
1955	6.0	77.6
1960	6.6	76.5
1965	7.9	75.8
1970	10.9	90.8
1975	12.1	88.1
1976	12.4	84.6

Source: National Center for Health Statistics.

Table 13:

Suicide Rates: 1950-1976

Suicides per 100,000 individuals

Ages	Non-White 15-19	Non-White 20-24	White 15-19	White 20-24	Population All
Year					
1950	1.9	4.9	2.8	6.4	11.4
1955	2.4	5.8	2.7	5.5	10.2
1960	2.4	4.5	3.8	7.4	10.6
1965	3.9	8.3	4.1	9.0	11.1
1970	4.2	12.0	6.2	12.0	11.6
1975	4.6	14.4	8.1	16.9	12.7
1976	5.4	13.8	7.7	16.8	12.5

Source: National Center for Health Statistics

Labor Turnover and Youth Unemployment

Linda S. Leighton
and
Jacob Mincer

1. Introduction: The Youth Unemployment Problem

Public concern about youth employment problems in the U.S. derives from three facts: (1) the unemployment rate of young people is high: in absolute numbers, in relation to adult unemployment, and in comparison with other countries, (2) unemployment rates of black youth are much higher and a large fraction of black youth does not even search for jobs, (3) youth unemployment rates have increased in recent years. The trend is not pronounced among whites, but the rate for black youth has risen from levels comparable to white rates in the 1950's to the present depression-like levels.

In this paper we do not address the problem of trends. It is an important question for assessing the plight of black youth and a smaller one for the white population beyond the adverse, but temporary conjunction of the business and demographic cycles. Rather, our question refers to the more permanent fact of high youth unemployment. Why is it so high? Are there criteria by which we can judge that it is too high? Why does it decline with age in a particular fashion?

Recent developments in the economics of labor markets provide two complementary approaches to the understanding of differential unemployment. Search models are applicable, in principle, to the analysis of duration of unemployment, as they highlight the conditions under which job search terminates. On the other hand, episodes of unemployment originate in the context of job or inter-labor force moves, so that models of labor turnover are most useful in understanding the incidence of unemployment. Since age differences in the incidence of unemployment are even larger than differences in unemployment rates, we emphasize labor turnover as the main framework for analyzing the relation between age and unemployment. We also employ a search model which captures some relevant aspects of the age differentials in job separation and in the duration of unemployment.

Our data sets are the panels of men in the National Longitudinal Surveys (NLS) and in the Michigan Income Dynamics surveys (MID). The data lend themselves to several analyses with which we hope to illuminate the structure of unemploymer

(1) We can decompose the "unemployment rate" observed in a period into incidence, or proportion of persons experiencing unemployment some time during the period, and average duration of unemployment during the period. This enables us to assess the relative importance of each component in creating unemployment differentials among age or any other population subgroups.

(2) Incidence and duration of unemployment can be observed in periods longer than a year. The rate at which incidence and duration increase as the period is lengthened indicates the degree of persistence of unemployment or its converse the degree of turnover among the unemployed. Time (tenure) dependence or heterogeneity can produce the observed degree of persistence. Both are predicted by job sorting and specific capital theories of labor mobility. These categories cannot be distinguished by lengthening the period, but are explored in regression analyses (section V).

(3) We relate current unemployment incidence to current labor mobility. According to the identity $P(u) = P(s) \cdot P(u|s)$, factors underlying labor mobility $P(s)$ ought to account for some of the patterns of incidence $P(u)$. We explore the factors underlying both probabilities in regression analyses.

(4) Further insights into differences in conditional unemployment and in duration of unemployment are obtained in a search model which also carries implications for quit/layoff behavior and for wage changes connected with separations and unemployment.

11. Components of Unemployment

The same rate of unemployment is observed during a survey week when a certain proportion of the labor force is unemployed two months on average or when only one third of that proportion is unemployed for a period of six months. The rate does not tell us whether a large number of those affected share a small burden or whether the opposite is the case. If the observation period is sufficiently long, the rate can be decomposed into incidence and duration of unemployment. Whether or not time spent in unemployment is to be interpreted as distress or as productive activity, we want to know whether it is incidence or duration which is mainly responsible for the differences in particular comparisons of population groups.

To do this we may define a personal unemployment rate during the period by the ratio of weeks spent in unemployment to weeks spent in the labor force:

$$u_i = \frac{W_{ui}}{W_{Li}} \qquad (1)$$

A simple average of u_i would measure the group weekly unemployment rate if each person spent the same number of weeks in the labor force. Otherwise the individual u_i must be weighted by their time in the labor force W_{Li} in averaging. As a result the group rate is obtained in:

$$\bar{u} = \frac{\sum_i W_{Li}\left(\frac{W_{ui}}{W_{Li}}\right)}{\sum_i W_{Li}} = \frac{\sum_i W_{ui}}{\sum_i W_{Li}} = \frac{N}{L}\cdot\frac{\bar{W}_u}{\bar{W}_L} = \frac{N}{L}\cdot\frac{\bar{W}_u}{52}\cdot\frac{1}{1-\frac{\bar{W}_o}{52}} \qquad (2)$$

Where N is the number of persons unemployed some time during the period, L the number of people in the labor force some time during the period, $\bar{W}_u$ the average number of weeks spent in unemployment by the unemployed, $\bar{W}_L$ the average number of weeks spent in the labor force by the labor force group, and $\bar{W}_o$ the average number of weeks of non-participation by the group. The first component $\frac{N}{L} = P(u)$ represents incidence of unemployment, that is, the probability of experiencing unemployment during the period. The second is the fraction of the year spent in unemployment, and the last is the inverse of the fraction of the year spent in the labor force.

Table 1 provides decompositions of unemployment experience by the NLS samples of young and mature men in the year 1969-71. The young men ranged in age between 16 and 27, the older men were 48 to 62 years old. The men are classified by school enrollment status, educational attainment, and race. Unemployment is restricted to the permanent unemployed, that is, to those whose unemployment represents, ex post, a job loss. The left-hand panel shows the components of levels of unemployment. The non-participation component is the major one among students. It is followed by incidence and duration in relative importance. Among the young incidence exceeds duration in producing the unemployment total, while the opposite is true in the older groups. Both incidence and duration are larger among blacks than whites and among the less educated youth compared to the more educated. In the right-hand panel, percent differentials in the unemployment rate and its components are calculated for selected groups. Clearly, higher unemployment rates of the young are attributable to higher probabilities of unemployment; duration actually works in the opposite direction. While duration always increases with age in the white sample, the age differential for blacks is quite small in 1966-67 and 1967-69 (Appendix tables 1-4).

On average, almost 40% of all unemployed older men were on temprary layoffs and were recalled by the employer, while about 25% of the non-student young unemployed workers were recalled. Inclusion of recall unemployment in Appendix table 5 shows a narrowing of the age differential in both the incidence and duration components of unemployment. This is because of the greater proportion of recall unemployment among the old.

TABLE 1

DECOMPOSITION OF INCIDENCE, DURATION AND NON-PARTICIPATION, 1969-71
(EXCLUDES TEMPORARY LAYOFFS)

Levels	U	$\frac{H}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{\theta}_u)}$
Young Whites	.052	.328	.136	1.15
n	(2364)			
Enrolled	.075	.455	.127	1.36
n	(850)			
Non-enrolled	.041	.257	.151	1.06
n	(1514)			
Educ.0-11	.056	.327	.156	1.10
12	.043	.261	.154	1.06
>13	.025	.181	.135	1.04
Young Blacks	.089	.450	.165	1.18
n	(835)			
Enrolled	.127	.581	.153	1.43
n	(217)			
Non-enrolled	.079	.414	.172	1.11
n	(618)			
Mature Whites	.018	.090	.194	1.06
n	(2167)			
Educ.0-11	.022	.099	.209	1.07
12	.013	.080	.160	1.03
>13	.036	.081	.189	1.04
Mature Blacks	.030	.117	.236	1.08
n	(967)			

Percent Differentials	U	$\frac{H}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{\theta}_u)}$
Young Blacks minus				
Young Whites	.545	.332	.193	.072
Enrolled	.524	.243	.229	.052
Non-enrolled	.648	.478	.127	.049
Young Whites minus Mature Whites	1.02	1.29	-.354	.087
Non-enrolled Young Whites minus Mature Whites	.801	1.04	-.250	.006
Young Blacks minus Mature Blacks	1.10	1.36	-.356	.091
Non-enrolled Young Blacks minus Mature Blacks	.976	1.26	-.319	.032
Mature Blacks minus Mature Whites	.473	.257	.195	.019
Education:				
less than H.S. minus H.S.				
Non-enrolled Wh.	.273	.226	.011	.032
Mature Whites	.515	.209	.264	.039
H.S. minus > H.S.				
Non-enrolled Wh.	.522	.367	.136	.018
Mature Whites	-.192	-.012	-.166	-.009

Note: $\bar{W}_u$ = proportion of time spent unemployed by unemployed.
θ_o = proportion of time spent out of the labor force by labor force participants.
$\frac{H}{L}$ = incidence of unemployment

Decompositions for the period 1966-67 and 1967-69 are shown in the Appendix tables. A comparison of the 1967-69 and 1969-71 provides information about cyclical effects, since overall unemployment was higher in 1969-71 than in the tight labor markets of 1967-69. We note that in the recession years duration of unemployment shows a greater increase (proportionately twice as large) than incidence of unemployment, and that the age differentials widen in incidence and narrow in duration.

111. Short and Long-Run Unemployment Experience

The longitudinal data enable us to observe the incidence and the amount of time spent in unemployment over periods of several years. As indicated in Table 2 the average incidence in a single year (p_1) in the 1966-69 period was 15.6% for young white non-students. Over the 3-year period it was P_3 = 32.5%. For the same group the average number of weeks spent in unemployment during a single year was 7.2 It was 10.4 over the 3-year period Clearly, if unemployment were completely persistent $P_3 = p_1$, and $W_3 = 3W_1$. At the other extreme, with complete turnover of the unemployed, $P_3 = 3p_1$ and $W_3 = W_1$. The actual figures are in between the extremes, so that a significant degree of persistence coexists with a great deal of turnover.

There are two possible, and not mutually exclusive reasons why the number of people experiencing unemployment some time in an n-year period is less than n-times the number of unemployed in a single year First, the experience of unemployment in one period increases the probability of becoming unemployed the next year. The events are dependent in probability because of time or tenure dependence: the longer a person stays in the job the less likely he is to separate, hence to become unemployed. The other possibility is independence in probability, but differences in sizes of probability across people in the group: those with higher probabilities are more likely to be found unemployed at any time than are others. Both possibilities give rise to the persistence (positive serial correlation) in observed incidence, so that $P_n < np$ and $W_n > W_1$.

Let us consider the two cases separately:

(1) The assumption of homogeneity, that is, $p_i = p$ for all individuals i, with time independent probabilities yields an upper limit for P_n (It is clearly less than np, which would require a negative serial correlation). Denote the upper limit by $\hat{P}_n$, $\hat{P}_n = 1 - (1 - p)^n$. The observed n-year incidence is $P_n < \hat{P}_n$, and a natural measure[1] of degree of persistence is $1 - \lambda$, where $\lambda = \frac{P_n - P}{\hat{P}_n - P}$. When $\lambda = 1$, there is no persistence in the unemployment experience. In Table 2, $\lambda = 69.5\%$, so the degree of persistence is 30.5% for young white non-students, but it is 42% for old NLS whites. When broken down by education, it appears that the increase in degree of persistence with age is a property of the less educated groups. It is higher in groups with education levels above high school and it does not change with age. Apparently, tenure dependence is weaker and/or heterogeneity lower in the young less educated than in the more educated groups. This is reasonable if the less educated acquire less specific capital on the job. Over time there is a differentiation in these groups into people who acquire job attachments and others who continue to drift. The result is a growth of tenure dependence and of heterogeneity with age.

(2) Assume independence, but heterogeneity. Here the group consists of individuals whose p_i differ. Define $p = E(p_i)$. Then $E(\hat{P}_{ni}) = E[1 - (1 - p_i)^n] < 1 - (1 - p)^n$, and $1 - E(q_i)^n < 1 - q^n$. The inequality holds because, as is well known, $E[E(q_i)] > [E(q_i)]^n$. In other words, if homogeneity and independence obtained within each of the subgroups differing in p_i, the observed P_n would be smaller than $\hat{P}_n$ expected on the assumption of homogeneity of the whole group.

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[1] This measure has sampling properties akin to the likelihood ratio, according to R. Shakotko. We do not explore these issues.

TABLE 7

Turnover and Persistence of Unemployment 1966-69

(Included Temporary Layoffs)

	p	P_n	$\hat{P}_n$	n	λ	w	w_n
Young Whites							
Enrolled	.181	.379	.450	1021	.737	6.92	9.90
Non-enrolled	.156	.325	.399	803	.695	7.22	10.40
Education							
0-8	.240	.500	.561	118	.809	8.20	11.81
9-11	.194	.390	.476	196	.723	8.57	12.53
12	.129	.271	.339	377	.673	5.98	8.56
13-15	.127	.250	.336	68	.589	5.77	8.82
16+	.038	.114	.109	44	1.06	3.20	3.20
Young Blacks							
Enrolled	.300	.625	.657	291	.911	8.29	11.93
Non-enrolled	.266	.502	.604	335	.697	9.95	15.82
Mature Whites	.093	.187	.254	3495	.581	12.62	18.90
Education							
0-8	.127	.245	.335	1274	.566	12.79	19.92
9-11	.086	.170	.237	708	.552	12.87	19.63
12	.073	.151	.202	872	.607	12.46	17.94
13-15	.090	.195	.245	298	.675	11.14	15.36
16+	.036	.088	.104	343	.755	13.27	16.30
Mature Blacks	.134	.266	.350	1491	.607	11.68	17.67

Note: P_n = the observed probability in an n year period.
p = an average of the n year single probabilities
$\hat{P}_n = 1 - (1 - p)^n$ assuming p is an independent yearly probability
W_n = the average total weeks spent unemployed by the unemployed in an n year period.
w = a weighted average of the n single year average total weeks unemployed.
$\lambda = \dfrac{P_n - p}{\hat{P}_n - p}$

Of course, the observed P_n will be even smaller if time dependence (or heterogeneity) obtains within the subgroups. The data in Table 2 cannot distinguish whether it is heterogeneity or time dependence which produce a less than proportionate increase in incidence and in time spent in unemployment. Regression analyses described in section (V) explores these matters further and suggests that both factors are at work in producing the result.

IV. Incidence of Unemployment and Labor Turnover

Since it is incidence that is responsible for high levels of youth unemployment we direct our attention primarily to the analysis of P(u) and secondarily to the question why adult men experience longer spells of unemployment.[2] Spells of unemployment occur, if at all, at the instance of job change or of movement between the non-market (household, school, the military) and the labor market. They also occur without job change in the case of recalled workers on temporary layoffs.

Unemployment incidence is definitionally related to labor turnover in the probability formula $P(u) = P(s) \cdot P(u|s)$ when recall unemployment is excluded. For the sake of completeness we present our findings both excluding and including recall unemployment.

Published data classified by age show that the high rates of youth unemployment drop quite sharply to relatively low levels beyond the first half-decade of working life. Table 3 shows that the age-profile of unemployment incidence is very much a reflection of the typical shape of the age-mobility profiles. In the upper panel we see that in 1961 almost half of the job

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[2] While our tables provide information on weeks of unemployment during the year, rather than average duration of a spell, the results are very much the same when measured by duration of spell (Leighton, 1978).

Table 3
JOB MOBILITY AND UNEMPLOYMENT
(Men, 1961)

	18-19	20-24	25-34	35-44	45-54	55-64
Prop. of Job Changers	23.5	24.4	14.9	10.2	7.1	4.0
P(U/JC)	47.7	50.1	46.0	46.7	49.2	54.2
P(L/JC)	41.5	43.6	43.8	49.8	58.4	70.6
P(Q/JC)	58.5	56.4	56.2	50.2	41.6	29.4

Source: SLF No.35, Job Mobility in 1961

(Men, 1972)

	18-19	20-24	25-34	35-44	45-54	55-64
Prop. with Job Tenure less than a Year in Jan. 1973.[a]	67.5	49.3	25.0	13.7	9.7	7.1
Prop. with Unemployment during 1972[b]	30.8	28.9	16.3	10.4	9.4	8.8

Sources: SLF No.172, Job Tenure of Workers, January 1973, and SLF No.162, Work Experience of the Population in 1972.

[a] Includes entrants, reentrants, and retirees

[b] Includes temporary layoffs and labor force dropouts

changers became unemployed during the year although this proportion increased somewhat with age. In the lower panel mobility is defined more broadly as the proportion of the labor force who have been on the current job (with the current employer) less than a year in January 1973. Incidence of all men in the labor force and not merely of job changers is shown in the lower row of the lower panel. Here the age curve of incidence is also convex (starting at age 20) as is the mobility curve, but quite a bit flatter, expecially beyond age 35. This is because (a) temporary layoff unemployment is included in the figures which almost doubles the incidence at older ages, and (b) even when temporary layoffs are excluded, the quit/layoff ratio declines with age. (See rows 3 and 4 of Panel 1). Since the probability of unemployment is higher following layoffs than quits, unemployment conditional on separations increases with age. In view of the relatively minor changes in conditional unemployment, the steep decline of youth unemployment in the early years of experience can be attributed to the convex shape of the age curve in labor mobility.

We have shown elsewhere (Mincer & Jovanovic, 1979) that the age decline in job separations is due primarily to the fact that the probability of separating declines with tenure of the current job, whether or not the separation is initiated by the worker or the employer. The theory underlying this relation is that the informational process of job matching and the accumulation of specific capital on the job create growing differences between worker productivity in the current job and elsewhere as well as differences between wages in current and alternative employments. The convexity of the tenure-mobility profile is due to the eventual completion of specific capital accumulation in the firm. The experience (age) profile of mobility is easily derived from the tenure profile: Given $s = f(T,X)$, where s is the mobility (separation) rate, T length of tenure, and X length of experience in the labor market:

$$\frac{ds}{dx} = \frac{\partial s}{\partial T} \cdot \frac{dT}{dx} + \frac{\partial s}{\partial x} \qquad (3)$$

The negative slope $\frac{\partial s}{\partial T}$ diminishes with T, and $\frac{dT}{dx}$ is positive and non-increasing.[3] The convexity of the age mobility curve s(x) is thus due to the convexity of the tenure curve. The "aging effect", $\frac{\partial s}{\partial x}$, steepens the slope of the experience profile but does not affect its convexity. This aging effect reflects declines of mobility with age at fixed levels of tenure, and is pronounced in quits but not in layoffs (M-J, Table 1).

The longer a worker stays in the firm the less likely he is to separate. Consequently he is less likely to become unemployed, unless separations after a longer stay in the firm carry a sufficiently higher risk of unemployment. This may be true of permanent layoffs which are less expected by higher-tenured employees, while the opposite ought to hold for quits since the opportunity cost of unemployment increases with tenure. These predictions are weakly confirmed in our MID regressions[4] The opposing signs of unemployment conditional on quit and layoff cancel in total separations so that P(u|s) shows no clear pattern with tenure as is shown in Table 4.

Consequently, the tenure profile of unemployment should reflect the profile of separation, and the analyses of the age(experience) profile of unemployment incidence can be represented equivalently in:

$$\frac{dP(u)}{dx} = \frac{\partial P(u)}{\partial T} \cdot \frac{dT}{dx} + \frac{\partial P(u)}{\partial x} \qquad (4)$$

Decline and convexity of the age profile of unemployment is thus due, as was

[3] $\frac{dT}{dx} = (1 - s) \cdot Ts > 0$, and $\frac{d^2T}{dx^2} < 0$. For argument and evidence see (Mincer and Jovanovic, pp.14)

[4] Not shown here.

true of separations, to the sharp decline and convexity of the tenure profile of incidence.

The tenure profiles of incidence and of separations are shown in Table 4. Over the first few years of tenure, the decline in unemployment incidence appears to be somewhat more rapid than the decline in separation for both age and race groups. Aside from a first year decline, the probability of unemployment conditional on separation P(u|s) does not change systematically. However, as we already noticed in Table 3, P(u|s) is higher at older ages.

Among blacks the age differential in P(u|s) varies over the cycle. It is observable in 1969-71, but not in 1967-69. As noted before, a similar cycle pattern was observed in age differentials in duration. The age increase in P(u|s) arises largely as a result of the increase in the layoff/quit ratio (shown in Table 3), but also because of an increase in the probability of unemployment conditional on layoff P(u|L). However, P(u|Q) decreases slightly with age.[5]

The age increase in the conditional probability P(u|s) is the reason for the practical absence of an aging effect ($\frac{\partial P(u)}{\partial x}$ in eq. 4) in unemployment in the face of a significant aging effect in separations. At given levels of tenure the difference in P(u) between the young and the old white men is small although the difference is evident among the blacks who show a stronger "aging effect" in separations (temporary layoffs excluded). The age differences also increase in the recession period 1969-71 (see Appendix table 7).

We check on the age effect with the MID data which covers the complete age range. The absence of an aging effect in the probability of unemployment of whites is confirmed in the MID data even though the period covered (1975-76) was a period of high unemployment. A regression of P(u) on experience (years spent in the labor force) x yields the equation (t-ratios in parentheses):

$$P(u) = .162 - \underset{(2.7)}{.0060x} + \underset{(1.8)}{.0001x^2} \qquad (5)$$

When job tenure T is included in the equation, the effect of x vanishes.

Table 4

INCIDENCE OF UNEMPLOYMENT IN 1967-69 BY TENURE
(EXCLUDES TEMPORARY LAYOFFS)

Tenure as of 1967	Young White Men			Young Black Men			Mature White Men			Mature Black Men		
	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)
0	.262	.686	.381	.448	.753	.594	.244	.472	.491	.264	.472	.560
1	.134	.444	.303	.216	.581	.372	.090	.285	.317	.121	.258	.471
2	.107	.393	.271	.128	.282	.454	.083	.208	.300	.300	.367	.818
3	.067	.278	.240	.231	.577	.400	.053	.187	.286	.167	.208	.800
4	.096	.327	.294	.091	.546	.167	.092	.277	.333	.119	.190	.625
5	.077	.462	.167	.167	.333	.500	.050	.117	.429	.161	.355	.454
6	.059	.118	.300	.000	.333	.000	.051	.136	.375	.154	.231	.667
7	.125	.250	.500	.000	.500	.000	.046	.197	.231	.050	.100	.500
8	.000	.400	.000	.000	.333	.000	.052	.121	.429	.069	.103	.667
9	1.00	1.00	1.00	-	-	-	.050	.175	.286	.059	.176	.333
10-14	.500	.500	1.00	.500	.500	1.00	.028	.089	.320	.046	.110	.417
15-19							.029	.089	.292	.028	.042	.500
20-24							.044	.064	.625	.050	.115	.438
>25							.024	.081	.235	.032	.105	.231
Total	.178	.518	.342	.337	.642	.525	.066	.163	.382	.095	.179	.519
n	(1065)		(552)	(410)		(263)	(2084)		(340)	(892)		(160)

Note: Students are excluded.
Young samples become very small for whites and blacks at seven and three years of tenure respectively.

Tenure effects are strong: unemployment declines twice as rapidly over a year of tenure than over a year of experience.

$$P(u) = .172 - \underset{(.9)}{.002x} - \underset{(.8)}{.00004x^2} - \underset{(4.3)}{.0132T} + \underset{(2.8)}{.0003T^2} \qquad (6)$$

Both the experience profiles in (5) and the tenure profile in (6) are convex. Clearly, P(u) does not depend on x, but on T. In other words, unemployment declines with age not because of aging, but because of the lengthening of tenure: $\frac{dT}{dx} > 0$ and $\frac{\partial P(u)}{\partial x} = 0$ in equation (4).

The conclusion must be that the short tenure level of the young is the main reason for the age differential in the incidence of unemployment. By definition, new or recent entrants and reentrants into the labor market have short levels of tenure. The fact that their unemployment incidence is not higher than the incidence of older men at comparable levels of tenure suggests that it is not behavior or circumstances peculiar to young people, but the dynamics of "experience search" in the labor market which is largely independent of age.

Does the finding of similar incidence at comparable tenure levels of the young and the old mean that youth unemployment is not excessively high? Not necessarily. One may argue that turnover is excessively high, so that tenure is unduly short among the young. Also, one may argue that older job movers with whom we are comparing the early-tenured young represent an adverse selection of unstable workers. There is some evidence that this suspicion is correct: older men with short tenure tend to be persistent movers whose wages and wage progress over their careers are lower than those of stayers, while such differences (between movers and stayers) are negligible among the young (M-J, Tables 5 and 6).

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5. White non-student job quitters report a probability of unemployment of .313 in 1967-69 compared with .213 for mature men. For blacks these figure are .503 and .333 respectively.

Is it excessive turnover or is it newness in the labor market that produces the high early unemployment of the young? It is possible that among workers of *comparable quality* a first encounter with the labor market produces more turnover and unemployment than at early levels of tenure on any subsequent job. Being new in a labor market is an experience not restricted to the young. We may, for instance, compare the young with international and internal migrants of all ages who also encounter a new labor market. Since migrants do not represent an adverse selection -indeed the opposite is argued and shown to be the case in migration studies[6] - their unemployment is not likely to reflect *excessive* turnover.

Table 5 presents comparisons between the unemployment experience of migrants (of all ages) and of young natives: while unemployment rates of young non-migrants (age 18-24) are over twice as high as the rates of adult men, the rates of men who arrived in the U.S. from abroad were twice as high as the youth rate in *all* age groups (Panel A). The reason the immigrant rates are higher is because they had at most only a year of experience in the U.S. labor market certainly less than the (18-24) youth had on average. Rates of the immigrants are comparable to the unemployment rates of men who entered or reentered the labor force during the year (Panel B), and, indeed, are somewhat higher than the rates of young (18-24) men who have less than a year of experience in the labor market.

In Panel (C) immigrants (regardless of age) are compared with natives of the same (modal HS) educational level by *years of experience* in the U.S. labor market. During the first 2 years the unemployment rate of immigrants is somewhat higher than of the young natives but it declines more rapidly. Initial handicaps (language?) in settling in a job are overcome more quickly by immigrants. The slower rate of decline among the young reflects the change from single to married status and from part-time part-period to full-time, full-period work. Thus, although the high initial turnover and unemployment of the young men e no greater than that of immigrants, a group that is highly motivated and committed to the labor market, the decline in turnover and unemployment is slower, The growth of commitment to the labor market takes time in the transition from dependent member of parental household to head of own family, with the mix of school, leisure, and work shifting toward the latter in the allocation of time. The significance of these factors in affecting unemployment incidence is shown in regression analyses to be described in the next section.

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[6] Chiswick (1978)

Internal migrants represent a group which is intermediate, in an informational and cultural sense, between immigrants and native experienced (non-migrant) workers. Their unemployment rates are lower than those of immigrants during the first year in the new location and comparable to the rate of young non-migrants (row 2 of Panel A). Again this comparison is biased because the young nonmigrants have had more than one year of labor market experience, while the migrants have been only a year or less in the new location.

Table 5A, drawn from the NLS data, compares the incidence of unemployment of migrants during the first four years in the new labor market with the unemployment of young men with at most 4 years of labor market experience in 1967. Migrants who were unemployed at origin just before migrating were eliminated from the sample so as to avoid a possible adverse selection which would bias upward the destination unemployment of migrants. Within-firm geographic transfers were also eliminated to avoid an opposite bias. Temporary layoffs were excluded, and the sample restricted to non-student, white men. The results are: incidence of adult married migrants was (14%) about the same as for the young, married men and 19% for the non-married adult migrants

TABLE 5

(A) UNEMPLOYMENT OF NEWLY ARRIVED MIGRANTS, MEN, MARCH 1963, (Migration after March 1962) (Rates)

	All	18-24	25-44	45-64
Non-migrants	5.5	11.2	4.8	4.8
Migrants	12.2	15.5	9.2	16.7
Immigrants	22.1	22.9	18.0	22.5

(B) UNEMPLOYMENT OF LABOR FORCE ENTRANTS, (Not in Labor Force, MARCH 1962; In Labor Force, MARCH 1963) (Rates)

	All	18-24	25-44	45-64
Non-migrants	20.0	19.6	18.5	23.0
Migrants	18.6	21.5	15.0	22.4

Note: U rate of 18-19 year old men was 16% in October 1963.

Source: SLF No. 44, Geographic Mobility and Employment Status

(C) UNEMPLOYMENT RATES OF IMMIGRANTS AND NATIVES BY EXPERIENCE, 1970 CENSUS WEEK

Experience	0-2	2-4	4-6	6-8	8+
Natives	9.3	6.0	4.7	4.1	2.0
Immigrants	11.4	3.5	2.5	3.4	1.9

TABLE 5A

INCIDENCE OF UNEMPLOYMENT, 1967-69, NLS WHITE MEN

	ALL	MARRIED	NOT MARRIED
	(EXCLUDING	TEMPORARY	LAYOFFS)
Mature Men 0-4 Years Residence in 1967	.148	.141	.187
n	859	786	73
Young Non-Students 0-4 Experience in 1967	.189	.128	.260
n	644	344	300
	(INCLUDING	TEMPORARY	LAYOFFS)
Mature Men	.168	.165	.188
Young Non-Students	.230	.160	.310

Note: Respondents with unemployment in place of origin are deleted.

compared to 26% for young, single men. Inclusion of temporary layoff unemployment raises the figures for the young somewhat more than for the old migrants, the reverse of the general case.

We think it is fair to conclude that the major circumstance responsible for high youth unemployment is newness in the labor market, rather than young age and unstable behavior. This is not to say, however, that the frequency of unemployment among the young stands in an immutable ratio to that of the adults. Increases in young cohorts consequent on the "baby boom" create larger proportions of young workers with short tenure. Similarly, lengthening of school enrollment produces shortening of tenure in fixed age groups, so that unemployment of young non-students is more prevalent (relative to adult unemployment) in countries with higher educational attainment. Of course, the partial labor market commitment of youth in transition in school and family status is a factor in greater turnover as is the interruption of work experience by military service. Minimum wage legislation may also be important although its impact on employment and labor force participation is stronger than on unemployment or on turnover. Note that black youth were not included in our comparisons with migrants and we have already seen that their unemployment incidence exceeds not only that of whites but also of black adults of comparable levels of tenure, especially in early tenure where most unemployment is concentrated

V. Factors Affecting the Incidence of Unemployment

The apparently close relation between turnover and unemployment suggests that some or most of the variables which affect separations are factors which also affect unemployment. We ascertain these factors and the similarity of their effects in parallel regressions of separations and of unemployment incidence on the same set of independent variables.

As is well understood in the analysis of labor mobility the observed reduction of separation probabilities as tenure lengthens may be a statistical illusion rather than a description of individual behavior. Suppose that individual propensities to move are not reduced by tenure yet they differ among workers. In that case the estimated tenure profile of mobility S(T) observed across a sample of workers will have a downward slope and will be convex as well: Persons with high propensities to move separate at early levels of tenure while those with lower propensities stay on for longer periods. As only stayers remain in long tenure classes, the apparently declining tenure curve would level off at low separation rates in the long-tenured classes.

Much the same phenomenon may be expected to appear in the statistical treatment of unemployment incidence. Unemployment risk may not be related to duration of job tenure, yet heterogeneity - differences among individuals in the unemployment risk to which they are subject- can create exactly the same spuriousness in the tenure profile, given the relation between separation and unemployment. Actually, heterogeneity and "tenure dependence" are not mutually exclusive hypotheses regarding labor mobility and unemployment incidence. Indeed, the theory of job sorting and of acquisition of specific human capital (cf. M-J pp.9-13)implies heterogeneity in levels and slopes of tenure profiles. Therefore, the heterogeneity bias does not fabricate an unreal tenure curve. It merely steepens the slope of the real (average) tenure curve.

Differences in levels of tenure profiles can be indexed by observations on past mobility behavior. If so, their inclusion in the regression reduces the bias in the tenure slope. Other measured factors represent heterogeneity not captured by the limited observations on past mobility. Their inclusion further reduces the tenure slope while increasing the explanatory power of the regressions.

A comparison of the separation and unemployment regressions shows that the probability of unemployment is just as labor mobility, subject to tenure dependence and that individual characteristics, such as education, health, marital status, local unemployment rate, and job training, affect the probabilities of separation and of unemployment, given tenure. These regressions appear in Tables 6A and 6B for NLS young white non-students (1969-71), in Tables 6C and 6D for the MID (1975-76), and in Tables 6E and 6F for mature NLS men (1969-71). For the NLS, the dependent variables are defined as number of separations and number of unemployment spells during the period; for the MID survey, as the probability of separation and the probability of unemployment respectively. Temporary layoffs are excluded. Comparable regressions including recall unemployment appear in the appendix. Results are similar for both number and incidence of events; however, we refer to both as incidence of unemployment and separation. (See Appendix tables 17, 18.)

As we noted before, an experience profile which appears in the first column of the regression disappears once tenure (and its square) are added. This means, that within the observed age range (which is limited in the NLS), probabilities of both separation and unemployment are the same at given levels of tenure regardless of age. In the complete age range (available in the MID data), the inclusion of tenure reduces but does not eliminate experience effects on separations. However, such "aging effects" are eliminated in the unemployment incidence equations.

Next, the inclusion of heterogeneity indices (of past behavior) and of heterogeneity factors reduces the tenure slope both in separations and in unemployment incidence. Indeed, in the NLS data the slope is cut in half in the longest equation, though more than half of the reduction is achieved when prior mobility indices are added to tenure. Tenure remains significant after all other variables are included. Both prior separations (per year) and prior unemployment (conditional on separations) were used as such indices in NLS. Prior unemployment incidence is unconditional in MID.

The coefficients of tenure are quite similar in both the separation and unemployment equations in elasticity terms. The coefficients on prior variables are, in this sense, larger in the unemployment equation. Past mobility, especially if it frequently results in unemployment, predicts the risk of unemployment in the future more strongly than it predicts the probability of separation

Three training variables were used in the young NLS regressions: company training on the current job, training prior to the current job, and off-the-job training. Of these only the first approaches statistical significance and, as would be expected on specific capital grounds, it reduces both separations and unemployment incidence. Unemployment incidence is positively affected by the local level of unemployment which, however, does not affect separations. This is an interesting finding. It suggests that the observed geographic differences in unemployment reflect differences in local "aggregate demand" conditions (these are likely to be sectoral from the point of view of the entire economy) rather than differences in frictional unemployment. In the former case fewer quits compensate for greater layoffs as unemployment increases, in the latter case higher unemployment is associated with higher quits and layoffs, hence higher separations. Indeed, the local unemployment rate affects layoffs positively and quits negatively (as appears in appendix tables 19 and 20

Both separations and unemployment incidence are negatively related to education and to marital status. Short hours (part-time work) and non-participation some time during the year (or in prior years) are associated with higher probabilities of separation and of unemployment in the young and old NLS data. (In MID part-timers appear to have fewer separations and the effect of part-time work on unemployment incidence disappears.)

Union membership reduces separations, and has no significant effect on incidence, unless temporary layoff unemployment is included when the effect becomes positive. Employment in the government sector has a weak negative effect on separation and on unemployment in the young NLS, but both effects are stronger at older ages (MID and NLS).

Bad health has no clear effects on separations and a positive effect on unemployment incidence in 1967-69 in the young NLS sample. Both effects are positive in the MID but not clear in the older NLS samples.

The following conclusions may be drawn. Regression results strongly support the turnover hypothesis of unemployment incidence. To the extent that differences in job sorting and specific capital processes underlie variation in labor mobility across people, they are important in creating differential unemployment. Therefore, both tenure dependence and heterogeneity are characteristic of unemployment incidence as they are of separations. Factors which account for the convex (decelerating) decline of the incidence of unemployment with age are: lengthening of tenure with age, change from single to marital status, and the shift from part-time and part-period work activities to full-time work.

We should note the relevance of marital status, part-time work, and non-participation in understanding the comparison with migrants in Table 5 (Panel C). The transition from school to market and from parental to own household which is observed in a cross-section of young people is gradual. It results in a slower decline of separation (lengthening of tenure) compared to the experience of largely adult migrants whose work in the new labor market was the major reason for migration.

A comparison of unemployment P(u) regressions with separation regressions leaves out questions about the conditional probability of unemployment. This probability P(u|s) enters the product in P(u) = P(s)·P(u|s). It was shown to increase with age in contrast to both P(s) and P(u). What are the factors associated with P(u|s) and why does it increase with age? We try to estimate factors affecting P(u|s) in two ways. In "augmented regressions" we add separation variables to all the others (col.4 of the Tables) and study factors affecting unemployment given separations. The alternative procedure is to restrict the regressions to workers who moved, that is to job separators as well as to entrants and reentrants. These we call "restricted regressions".

In both kinds of regressions(cols.4,6) the variables which remain significant are: the local unemployment rate, prior conditional unemployment, marital status, education, and less clearly part-time work. Union membership becomes positive and significant at least in the 1969-71 period. Similar results are found in MID regressions. The variables show higher t-scores in the restricted regressions (col. 6), but the bulk of "explanatory power" in the augmented regressions is due to the turnover variables. Indeed, in the 1969-71 sample these variables produce an adjusted $\bar{R}^2 = .505$ which increases only to .521 when all the factors are added.

Table 3 suggested that both separations and unemployment are more heavily weighted by layoffs than by quits at older ages. Some of the variables which are significant in affecting conditional unemployment in the regressions are apparently more closely associated with layoff unemployment. This is true of the local unemployment rate, as already noted. Prior conditional unemployment must be weighted toward layoff, since unemployment conditional on layoffs is twice as high as unemployment conditional on quit. The same holds for unemployment of union members. However, education, marital status, and short hours affect both quits and layoffs and so affect the conditional in each type of separation. Interestingly, bad health which is not a factor in conditional unemployment of the young NLS, nor in MID, does appear in oldest groups (NLS) as a factor which increases quits but not layoffs.

REGRESSION VARIABLES

VARIABLE	DEFINITION
X	- Number of years since beginning the first job after leaving full-time school
T	- Duration of job held at beginning of interval
JTRAIN	- 1 if respondent attended company training school in the job held at beginning of interval
PTRAIN	- 1 if respondent received any training aside from regular school prior to job held at beginning of interval
GTRAIN	- 1 if respondent received any training other than company training school while employed on job held at beginning of period
LOCRATE	- Unemployment rate for labor market of current residence
PSEP	- Prior separations per year since 1966 (NLS); probability of separation per year since 1968 (MID)
PCOND	- Ratio of prior unemployment spells to prior separations (NLS); prior unemployment incidence (MID)
EDUC	- Completed years of education
HLTH	- 1 if health is poor
GOV	- 1 if public employee
UNION	- 1 if wages are set by collective bargaining in 1969
MARRY	- 1 if married, spouse present
PTIME	- 1 if 34 hour workweek or less
OLF	- 1 if incidence of unemployment in current period
POLF	- 1 if incidence of unemployment in prior years (MID)
SEP	- Number of job separations
ENTRY	- Number of periods of non-participation

TABLE 6A

THE DETERMINANTS OF SEPARATIONS, 1969-71, YOUNG WHITE MEN, NLS (EXCLUDING TEMPORARY LAYOFFS)

	B	t	B	t	B	t
	(1)		(2)		(3)	
CONST	1.12		.749		1.50	
X	-.110	3.23	.064	1.76	.054	1.42
X^2	.007	2.61	-.003	1.16	-.003	1.06
T			-.310	6.45	-.221	4.70
T^2			.026	4.15	.018	3.01
JTRAIN			-.276	2.59	-.129	1.24
PTRAIN			.083	.811	.091	.924
GTRAIN			.017	.202	.090	1.12
LOCRATE			.016	.669	.008	.345
PSEP			.039	4.58	.036	4.41
PCOND			.147	1.80	.045	.573
EDUC					-.064	3.83
HLTH					-.202	1.16
GOV					-.113	.999
UNION					-.159	2.10
MARRY					-.261	3.28
PTIME					.279	2.74
OLF					.607	7.87
$\bar{R}^2$	.008		.102		.173	
$\bar{X}$	.852					
n	1351					

TABLE 6B

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT, 1969-71, YOUNG WHITE MEN, NLS (EXCLUDING TEMPORARY LAYOFFS)

	B (1)	t (1)	B (2)	t (2)	B (3)	t (3)	B (4)	t (4)	B (5)	t (5)	Incidence among movers and entra B (6)	t (6)
CONST	.642		.115		.650		-.064		.007		.484	
X	-.068	2.61	.029	1.03	.025	.854	-.004	.173			.019	.97
X^2	.004	1.79	-.002	.854	-.002	.889	-.000	.219			-.002	1.28
T			-.171	4.59	-.120	3.24	-.016	.562			-.045	1.68
T^2			.014	2.88	.010	2.03	.001	.315			.003	.70
JTRAIN			-.111	1.34	-.016	.200	.043	.713			.091	1.51
PTRAIN			.117	1.47	.118	1.52	.072	1.25			.056	1.03
GTRAIN			-.016	.257	.037	.585	-.018	.382			-.009	.20
LOCRATE			.064	3.41	.056	3.03	.054	3.94			.039	3.28
PSEP			.023	3.56	.021	3.31	.002	.512			.007	1.97
PCOND			.244	3.84	.169	2.71	.153	3.30			.099	2.92
EDUC					-.043	3.29	-.011	1.17			-.021	2.38
HLTH					-.117	.854	.002	.000			.039	.46
GOV					-.010	1.12	-.046	.696			.014	.20
UNION					.078	1.32	.151	3.43			.050	1.27
MARRY					-.242	3.87	-.101	2.17			-.120	2.96
PTIME					.155	1.94	.001	.032			.089	1.73
OLF					.348	5.75	-	-			-.030	.81
SEP							.408	13.53	.434	14.79		
SEP^2							.019	4.43	.017	3.95		
ENTRY							.031	1.12	.063	2.31		
$\bar{R}^2$	.007		.082		.133		.521		.505		.084	
$\bar{X}^2$	.452										.445	
n	1351										706	

TABLE 6C

THE DETERMINANTS OF SEPARATIONS , 1975-76, WHITE MEN, MID
(EXCLUDES TEMPORARY LAYOFFS)

	(1)		(2)		(3)	
	B	t	B	t	B	t
CONST	.266		.228		.452	
X	-.010	3.92	-.007	2.37	-.007	2.42
X^2	.0002	2.58	.0001	1.98	.010	1.70
T			-.010	2.51	-.012	3.07
T^2			.0002	1.44	.0003	1.95
LOCRATE			.001	.200	.001	.480
PSEP			.166	3.02	.136	2.44
PCOND			.124	2.85	.094	2.05
EDUC					-.010	2.74
HLTH					.090	2.64
GOV					-.027	1.22
UNION					-.024	1.18
MARRY					-.073	2.38
PTIME					-.122	2.24
POLF					-.070	1.59
$\bar{R}^2$	.024		.056		.075	
$\bar{X}$	.149					
n	1562					

TABLE 6

THE DETERMINANTS OF THE INCIDENCE OF UNEMPLOYMENT, 1975-76, WHITE MEN, MID (EXCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t	B	t	B	t	INCIDENCE AMONG MOVERS B	t
	(1)		(2)		(3)		(4)		(5)		(6)	
CONST	.162		.099		.296		.090		.018		.769	
X	-.006	2.73	-.003	1.26	-.001	.574	-.0001	1.28			.013	1.17
X^2	.0001	1.74	.0001	1.08	-.000	.005	.002	.985			-.0003	1.28
T			-.008	2.58	-.007	2.06	-.001	.469			-.0001	.000
T^2			.0002	1.63	.0001	1.32	.000	.332			-.000	.452
LOCRATE			.003	1.20	.004	1.60	.003	1.62			.020	1.69
PSEP			.100	2.10	.114	2.52	.052	1.40			.076	.473
PCOND			.246	7.01	.209	5.68	.166	5.43			.387	2.86
EDUC					-.010	3.53	-.006	2.38			-.034	2.36
HLTH					.050	1.82	.010	.424			-.009	.008
GOV					-.043	2.37	-.030	2.04			-.042	.476
UNION					-.015	.943	-.005	.374			.051	.692
MARRY					-.084	3.40	-.052	2.49			-.204	2.20
PTIME					.034	.768	.087	2.40			-.125	.466
POLF					.105	3.00	.131	4.48			.239	1.33
SEP							.451	26.50	.475	28.08		
OLF							.018	1.10	.034	2.01		
$\bar{R}^2$	.012		.047		.103		.383		.336		.112	
$\bar{X}$	.094										.498	
n	1562										231	

TABLE 6F

THE DETERMINANTS OF SEPARATIONS , 1969-71, MATURE WHITE MEN, NLS
(EXCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t
	(1)		(2)		(3)	
CONST	.478		.480		.294	
X	-.019	1.71	-.016	1.62	-.005	.560
X^2	.0004	2.19	.000	1.89	.000	.477
T			-.019	4.85	-.014	3.97
T^2			.0004	4.08	.0003	3.29
LOCRATE			.003	.354	.004	.438
PSEP			.177	18.66	.164	18.31
PCOND			.080	2.32	.021	.628
EDUC					.003	.621
HLTH					.042	1.35
GOV					-.083	2.48
UNION					-.000	.000
MARRY					-.064	1.41
PTIME					.078	1.69
OLF					.505	15.22
$\bar{R}^2$	.004		.235		.326	
X	.278					
n	1957					

TABLE

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT, 1969-71, MATURE WHITE MEN, NLS
(EXCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t	B	t	B	t	INCIDENCE AMONG SEPARATORS B	t
	(1)		(2)		(3)		(4)		(5)		(6)	
CONST	.248		.245		.266		.147		.000		.653	
X	-.011	1.41	-.010	1.42	-.088	1.26	-.006	1.22	.286	13.77	-.005	.319
X^2	.0002	1.62	.0002	1.51	.0001	1.25	.000	1.34	.061	10.35	.000	.200
T			-.006	2.41	-.005	1.99	.000	.032			-.007	1.01
T^2			.0001	1.63	.0001	1.18	-.000	.641			.0001	.263
LOCRATE			.001	.095	.001	.164	-.001	.276			.005	.379
PSEP			.098	14.74	.096	14.34	.014	2.54			.023	2.45
PCOND			.097	4.00	.086	3.49	.077	4.14			.093	2.06
EDUC					.002	.604	.001	.344			.007	.943
HLTH					-.015	.632	-.027	1.54			-.081	1.56
GOV					-.007	2.70	-.029	1.56			-.130	1.77
UNION					.008	.397	-.003	.176			.009	.176
MARRY					-.063	1.87	-.036	1.41			-.123	1.68
PTIME					-.011	.311	-.043	1.66			-.040	.591
OLF					.110	4.45	-.089	4.37			-.137	2.65
SEP							.302	13.05				
SEP^2							.054	8.91				
$\bar{R}^2$	.001		.163		.174		.528		.516		.097	
X	.112										.386	
n	1957										391	

Altogether, the NLS regressions are not very helpful in explaining the age increases in conditional unemployment. Lower levels of education and of health and more frequent union membership among the old account for a part of it. The other variables have no or opposite effects on age patterns. That the variables we were able to measure do not account for the growth of conditional unemployment with age is apparent in observing the effects of experience on incidence in the regressions restricted to job movers. The effect is positive in the older NLS (ages 45 and over), and less so in MID (average age near 40) before and after all other variables are included. There are no experience effects in the restricted regressions within the first decade of work experience (the young NLS sample). Evidently, the probability of unemployment when separating increases at adult ages within each of the classes (levels) of the variables we have measured.

VI. Conditional Unemployment and Age Differences in the Duration of Unemployment

Although we are not able to ascribe much of the higher conditional unemployment at older ages to the factors we have measured, we know that it is largely an outcome of the increased layoff/quit ratio. Why do quits decline more rapidly at older ages than layoffs?

At given tenure levels a worker's incentives to quit decline as he ages because the payoff period to whatever benefit the quit produces is getting shorter. More importantly, we suggest that potential job changers encounter a diminished probability of finding a job at older ages. There are several possible reasons for this. Short prospective tenure inhibits hiring by employers in the presence of hiring or training costs. A record of job mobility at older ages is a deterrent to hiring for the same reasons, insofar as it suggests a higher probability of future separation, as it does in our findings. On the supply side, workers' human capital even if not specific to the firm becomes progressively more specialized to a narrower cluster of firms within an industry or occupation. The proportion of job changers who also change industry and occupation does diminish at older ages.

In the terminology of search models we argue that, on average, older workers who separate from jobs have a lesser probability of finding a job per unit of search time, not because they are holding out for a higher acceptance wage within the relevant wage offer distribution -though it is true of some-, but because the probability of getting any offer, that is the probability of finding a vacancy, is smaller. On this assumption we can show that older workers who separate will search longer when unemployed and quit less frequently while their acceptance wage will be relatively lower, so the wage gain will be smaller (or negative) for older job movers than for younger ones.

In the standard search model the individual samples from his wage offer distribution $f(w)$ receiving one offer per unit of time. The worker decides on an optimal wage floor which equates the gain from an additional unit of search to the cost of it. The resulting rule is:

$$P_a(\bar{W}_a - W_a) = c = W_a - z \qquad (7)$$

where W_a is the lowest acceptable wage, P_a is the probability of getting an acceptable wage offer, that is of $W \geqslant W_a$, $\bar{W}_a$ the mean of all acceptable wage offers; c is the (marginal) cost of search which includes direct and opportunity costs. The highest opportunity cost or foregone wage is W_a. Income offsets which are contingent on continued search such as unemployment compensation or the current wage when searching on the job enter costs with a negative sign. Duration of search is inverse to P_a. In this model search is longer the higher the acceptance wage which is higher the lower the cost of search.

Now the probability of accepting a wage offer must be redefined given that the probability of finding any offer in a (calendar) unit period can be less than 1. A lesser frequency of vacancies may be a result of depressed business conditions in general, or depressed markets for a particular type of labor, or a function of lesser efficiency or intensity of search. The optimum conditions become:

$$p \cdot P_a(\bar{W}_a - W_a) = c = W_a - z \qquad (8)$$

Here p is the probability of finding a job offer, P_a the probability of finding an acceptable job conditional on finding a vacancy, and $p \cdot P_a$ is the probability of finding an acceptable job. D is now the inverse of the product $p \cdot P_a$. As before, changes in c produce a positive relation between W_a and D. However, changes in p over the business cycle or otherwise, or differences in p across people tend to produce a negative correlation between W_a and D.

A reduction in p leads to a downward revision of W_a, hence to an increase in P_a. The question is whether $p \cdot P_a$ will rise or fall in (8). No perfectly general answer can be given to this question, but a most plausible answer is that $(p \cdot P_a)$ will fall, hence the duration of search will lengthen even though W_a is revised downward in consequence of a fall in p. It is easy to see that the difference $(\bar{W}_a - W_a)$ increases as W_a is lowered in a uniform or triangular wage offer distribution. When W_a is reduced, $\bar{W}_a$ is reduced by a smaller amount, so that $p \cdot P_a$ must fall, if c is fixed or reduced. Actually, c will be reduced since lowering of W_a will lead to a fall in foregone wages when search is continued. By the same token, an exponentially declining function (here log f is linear in W) will show an increase in the ratio $\frac{\bar{W}_a}{W_a}$ as W_a is reduced. Consequently $p \cdot P_a$ will fall since:

$$p \cdot P_a\left(\frac{\bar{W}_a}{W_a} - 1\right) = 1 - \frac{z}{W_a} \qquad (9)$$

Only an unusually high skew in the distribution, such as in the Pareto distribution yields a fixed $\frac{\bar{W}_a}{W_a}$ whatever the position of W_a. Even then $p \cdot P_a$ will fall as the right hand expression does. It is difficult to imagine that typical workers face a wage offer distribution which is as skewed and long-tailed as Pareto.

The conclusion that a lower p is very likely to produce longer search and lower acceptance wages holds both for unemployed and for employed searchers. In the latter case $c = W_a - W_o$, where W_o is the wage paid on the job. An increased duration of search on the job, of course, means a reduction in the frequency of quit.

In sum, workers facing fewer vacancies in their search may be expected to have a longer duration of search and a lesser wage gain when unemployed, and to inhibit their job change (quit) when employed. These conclusions are consistent with worker behavior during the business cycle: duration of unemployment increases and quits decline while layoffs increase, partly because employment demand declined and partly to substitute for a decline in attrition (quits). Note that in contrast to other models, this explanation of behavior during the business cycle does not assume myopia, or lags of adjustment.[7]

Applying the same model to the life-cycle we may argue that either p or c decline at older ages. A decline in c is not plausible except very early when labor market entrants become eligible for unemployment compensation. A decline in c would lead to increases in W_a and in wage gains, but the opposite

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[7] Cf Alchian in the Phelps volume (1970).

TABLE

CONDITIONAL UNEMPLOYMENT AND DURATION, 1967-69
(EXCLUDES TEMPORARY LAYOFFS)

	P(U|S)	P(U|L)	Q/L	Average Duration	Total Duration	Δw
Non-enrolled						
Whites	.342	.573	4.66	5.30	8.84	.785
Educ.0-11	.423	.641	4.26	5.74	9.91	.734
12	.329	.546	4.78	5.20	8.30	.772
>13	.218	.471	5.36	3.93	6.46	.881
Non-enrolled						
Blacks	.525	.607	3.03	6.33	11.87	.578
Mature Whites	.382	.623	1.62	9.99	16.17	.593
Educ.0-11	.443	.655	1.25	9.90	16.76	.466
12	.313	.640	2.20	10.29	15.34	.561
>13	.268	.385	3.00	10.03	14.13	1.00
Mature Blacks	.519	.725	1.17	11.35	17.86	.414

is implied by a fall in p, and is observed. The implications that older men have a longer duration of unemployment, a reduced $\frac{O}{L}$ ratio, and a lower W_a when changing jobs are strongly confirmed by the data in Table 7. The shorter duration of unemployment of the young is also due partly to relatively frequent inter-labor force mobility. Again, this is characteristic of very early labor force behavior and cannot account for the age-uptrend in duration of adult unemployment. Nor can this upturn be ascribed to the somewhat longer duration of layoff than of quit unemployment. Duration increases with age in both cases. Table 7 shows that a similar search interpretation can be given to unemployment differentials by race and, somewhat less clearly, by education. We elaborate on the race differentials in the next section.

Although we have no direct evidence on the reduction of p at older ages, $P(u|L)$ may be a good index of it. It increases with age, is inverse to education and is higher for blacks. The only exception is that $P(u|L)$ is less for the older, more educated whites compared to young whites in the same category.

In sum, as large as they are, age differentials in unemployment rates are attenuated by the longer duration of unemployment and higher probability of unemployment of older movers. Both the longer duration and the higher conditional probability of unemployment of older men can be ascribed to the decline in the probability of finding vacancies at older ages. Young white job changers face, on average, a more favorable environment in this respect.

VII. Black-White Differences in Youth Unemployment

Black youth unemployment has grown relative to white youth unemployment over the past two decades or longer. A fuller understanding of the present differential, therefore, requires an analysis of this trend. This is beyond the scope of our present work. We did replicate some of the statistical analyses on black data, and report some of the findings.

The salient features in the unemployment differentials are: higher incidence, longer duration, and greater non-participation among black youth as shown in Table 1. Those differences hold for both students and nonstudents. As the age comparisons in 1966-67 and 1967-69 (Appendix tables) show, the duration of black youth unemployment is not much shorter than the duration of unemployment of older blacks. Since the race differential in duration of older men's unemployment is small, it is not clear whether our NLS sample of older blacks understate their adverse position, or whether our findings about the young are, indeed, an indication of deterioration of labor market conditions in present cohorts of black youth. But these inferences are not mutually exclusive.

The longer duration of black youth unemployment compared with white youth, mirror Table 4 in higher conditional unemployment at each level of tenure. The higher incidence of unemployment of black youth is due both to the higher separation rates and to higher conditional unemployment at fixed levels of tenure. The result is that while the black separation rates are 20% higher than the white rates, the black incidence of unemployment is twice as high as the white.

Table 7 shows also that the black conditional unemployment P(u|s) is higher than the white largely because $\frac{Q}{L}$, the quit/layoff ratio is lower, and also because both conditionals P(u/L) and P(u/Q) are higher.[8] By a search model argument of the preceding section, we may infer that: if blacks face a lower probability of finding vacancies than whites do, their duration of unemployment is longer wage gain less, and quit/layoff ratio lower. It has been noted that black quit rates are not higher than rates of whites.[9] In our interpretation this does not suggest an equally stable work experience: total separations of blacks are higher, but quits are inhibited because of an adverse labor market, and some of the excess layoff is in part a substitution for reduced quit.

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[8]. See footnote 4.

[9]. Flanagan, (1978).

Some of the factors that appear to influence the higher black separation rates and their slower decline with experience are suggested in comparisons of black and white regressions (Tables 8A and 3B). The tenure effects are somewhat weaker, and the effect of training on the current job are, if anything, positive, rather than negative in the black sample. This suggests that blacks receive not only less training, but also a lesser specific training component of it. Marital status which reduces separations of whites has little effect on blacks. At the same time prior unemployment conditional on separation predicts future separations more sharply among blacks than among whites, that is, black movers who encounter unemployment are more likely to separate from jobs than are those who move without unemployment and more than comparable whites. Taken together, these effects may also explain why over the early years of experience the decline in separations and in unemployment incidence is not pronounced among non-enrolled blacks, when it is for whites.

So much for the differential regression effects as estimated in the regression coefficients. Differential characteristics of black youth also contribute to the higher unemployment. On average, black youths had less tenure, less training, lower education, fewer married, more working part-time and intermittently.

In our regressions designed to spot factors influencing conditional unemployment the clues for understanding why such unemployment is higher for blacks are sparse Education has no effect on blacks while it was negative for whites. Poor Health and non-participation increase black (conditional) unemployment. They had no effect on whites. Again the likely conclusion is that the conditional unemployment of blacks is higher because their quit/layoff ratio is lower at all levels of the factors.

TABLE 8A

THE DETERMINANTS OF SEPARATIONS, 1969-71, YOUNG BLACK MEN, NLS (EXCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t
	(1)		(2)		(3)	
CONST	1.32		.482		.432	
X	-.072	1.24	.129	2.02	.150	2.38
X	.000	.000	-.012	2.36	-.014	2.77
T			-.222	3.59	-.155	2.59
T			.019	3.04	.013	2.22
JTRAIN			-.115	.558	-.027	.138
PTRAIN			.154	.669	.257	1.16
GTRAIN			.125	.869	.243	1.72
LOCRATE			.012	383	.005	.164
PSEP			.070	4.71	.074	5.21
PCOND			.267	2.66	.244	2.46
EDUC					-.012	.589
HLTH					-.264	.682
GOV					-.346	1.94
UNION					-.489	4.17
MARRY					.003	.032
PTIME					.377	2.60
OLF					.528	4.77
$\bar{R}^2$	.023		.126		.203	
$\bar{X}$	1.01					
n	504					

TABLE 8

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT, 1969-71, YOUNG BLACK MEN, NLS (EXCLUDES TEMPORARY LAYOFFS)

	(1)		(2)		(3)		(4)		(5)		(6) INCIDENCE AMONG MOVERS AND ENTRANTS	
	B	t	B	t	B	t	B	t	B	t	B	t
CONST	.931		.230		-.200		-.404		.038		.280	
X	-.045	.869	.117	2.50	.167	2.95	.082	1.77			.019	.477
X^2	-.001	.195	-.011	2.44	-.014	3.15	-.006	1.75			-.002	.746
T			-.196	3.53	-.149	2.76	-.062	1.39			-.123	3.67
T^2			.017	3.14	.014	2.66	.007	1.59			.011	2.97
JTRAIN			.284	1.53	.332	1.84	.362	2.47			.092	.898
PTRAIN			.123	.594	.113	.565	-.015	.089			-.015	.130
GTRAIN			.156	1.21	.198	1.56	.058	.562			.051	.736
LOCRATE			.016	.559	.020	.756	.020	.892			.033	2.18
PSEP			.046	3.40	.051	3.96	.012	1.11			.009	1.28
PCOND			.265	2.94	.185	2.07	.049	.665			.054	1.18
EDUC					.014	.717	.018	1.17			.004	.367
HLTH					.868	2.50	1.00	3.55			.411	2.25
GOV					-.158	.990	.222	.170			.076	.746
UNION					-.185	1.75	.090	1.04			-.047	.787
MARRY					-.237	2.30	-.250	2.98			-.078	1.34
PTIME					.220	1.69	.019	.179			.066	.948
OLF					.523	5.26	-	-			.122	2.00
SEP							.637	9.07	.673	9.85		
SEP^2							-.023	1.70	-.026	1.93		
ENTRY							.077	1.59	.313	2.04		
$\bar{R}^2$	.018		.102		.179		.458		.435		.099	
$\bar{X}$	.708										.576	
n	504										314	

Our findings convey some impressions of greater job instability of blacks which is partly due to lesser training and to specific components of job experience, to greater non-participation, to weaker effects of education and of family status. Greater difficulties in job finding are consistent with longer duration of unemployment, inhibition of quits, and augmentation of layoffs. We do not know, however, how much of the difficulties are matters of discrimination, of perception of potential productivities by employers or of informational efficiency of job search. In contrast to the whites, unemployment of young blacks is higher than unemployment of older blacks at fixed tenure levels as we noted in Table 4. Also, the race differential in duration is larger at young than at older ages. Both of these findings may be a reflection of the deterioration in labor market conditions of recent cohorts of young blacks.

La plus ça change...?

A 1969 survey of research on youth labor markets concluded that "The normally high level of teenage unemployment is due primarily to the fact that so many teenagers are labor market entrants or reentrants rather than to their deficiency or instability as employees."[10] We amend this conclusion by interposing a continuum of job experience (job tenure running from 0 onwards to T) and showing how it translates into a rapid and decelerating age decline in the incidence of unemployment.

Our evidence is based on far richer data than were available to the researchers in the 1960's. But we do face a question of data comparability: the NLS shows lower unemployment rates for young non-students, consequently a smaller age-differential than the CPS does. Yet our findings of no "aging effects" are also reproduced in the MID data, apart from being consistent with the spirit of the conclusion reached a decade ago on the basis of fragmentary, cross-sectional CPS aggregates.

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[10] Kalachek (1969), p.2.

REFERENCES

Alchian, Armen. "Information Costs, Pricing, and Resource Unemployment." In Phelps, Edmund S. et al. Microeconomic Foundations of Employment and Inflation Theory. New York: W.W. Norton & Co., 1970.

Chiswick, Barry. "The Americanization of Earnings." Journal of Political Economy (October 1978).

Flanagan, Robert J. "Discrimination Theory, Labor Turnover, and Racial Unemployment Differentials." Journal of Human Resources 13 (1978): 187-207.

Kalachek, Edward. The Youth Labor Market. Policy papers in Human Resources and Industrial Relations No.12. Ann Arbor, Mich.: The Institute of Labor and Industrial Relations, University of Michigan and Wayne State University, 1969.

Jovanovic, Boyan and Mincer, Jacob. "Labor Mobility and Wages." Conference on Low Income Labor Markets. Universities-National Bureau Committe for Economic Research. June 1978.

Leighton, Linda. "Unemployment over the Work History." Ph.D. Dissertation, Columbia University, 1978.

Appendix Tables

TABLE 1

DECOMPOSITION OF INCIDENCE DURATION AND NON-PARTICIPATION, 1966-67
(EXCLUDES TEMPORARY LAYOFFS)

	Levels			
	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Whites	.033	.178	.144	1.28
n	(2293)			
Enrolled	.046	.207	.139	1.61
n	(1151)			
Non-enrolled	.024	.150	.152	1.06
n	(1142)			
Educ.0-11	.038	.209	.170	1.06
12	.018	.122	.140	1.06
>13	.012	.100	.114	1.06
Young Blacks	.080	.313	.187	1.36
n	(875)			
Enrolled	.118	.357	.175	1.87
n	(387)			
Non-enrolled	.062	.279	.198	1.12
n	(488)			
Mature Whites	.021	.067	.300	1.02
n	(2477)			
Educ.0-11	.028	.091	.305	1.03
12	.011	.045	.238	1.02
>13	.012	.030	.382	1.02
Mature Blacks	.032	.102	.301	1.04
n	(1136)			

	Percent Differentials			
	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Blacks minus Young Whites	.880	.562	.256	.062
Enrolled	.937	.545	.232	.160
Non-enrolled	.934	.622	.263	.050
Young Whites minus Mature Whites	.475	.979	-.729	.223
Non-enrolled Young Whites minus Mature Whites	.166	.804	-.676	.036
Young Blacks minus Mature Blacks	.912	1.12	-.476	.267
Non-enrolled Young Blacks minus Mature Blacks	.655	1.00	-.416	.068
Mature Blacks minus Mature Whites	.445	.421	.003	.018
Education:				
Less than H.S. minus H.S.				
Non-enrolled Wh.	.739	.539	.195	.006
Mature Whites	.967	.704	.247	.014
H.S. minus >H.S.				
Non-enrolled	.397	.201	.201	-.007
Mature Whites	-.064	.411	-.472	-.001

Append T E 2

DECOMPOSITION OF INCIDENCE DURATION AND NON-PARTICIPATION, 1966-67
(INCLUDES TEMPORARY LAYOFFS)

Levels

	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Whites	.037	.208	.138	1.28
n	(2293)			
Enrolled	.049	.217	.139	1.60
n	(1151)			
Non-enrolled	.029	.200	.138	1.06
n	(1142)			
Educ.0-11	.044	.257	.160	1.06
12	.024	.185	.120	1.06
>13	.013	.115	.108	1.06
Young Blacks	.088	.353	.183	1.26
n	(875)			
Enrolled	.122	.378	.173	1.87
n	(387)			
Non-enrolled	.071	.336	.192	1.12
n	(1142)			
Mature Whites	.027	.105	.247	1.02
n	(2477)			
Educ.0-11	.037	.143	.252	1.03
12	.014	.065	.218	1.02
>13	.014	.053	.258	1.02
Mature Blacks	.043	.166	.246	1.04
n	(1136)			

Percent Differentials

	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Blacks minus Young Whites	.867	.527	.277	.062
Enrolled	.918	.545	.214	.160
Non-enrolled	.895	.521	.331	.050
Young Whites minus Mature Whites	.327	.682	-.578	.223
Non-enrolled Young Whites minus Mature Whites	.090	.639	-.585	.036
Young Blacks minus Mature Blacks	.723	.752	-.295	.267
Non-enrolled Young Blacks minus Mature Blacks	.521	.703	-.248	.068
Mature Blacks minus Mature Whites	.471	.457	-.005	.018
Education:				
Less than H.S. minus H.S.				
Non-enrolled Wh.	.612	.325	.284	.006
Mature Whites	.944	.791	.141	.014
H.S. minus >H.S.				
Non-enrolled	.581	.476	.112	-.007
Mature Whites	.035	.199	-.166	-.0001

Appendix TABLE 3

DECOMPOSITION OF INCIDENCE DURATION AND NON-PARTICIPATION, 1967-69
(EXCLUDES TEMPORARY LAYOFFS)

Levels

	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Whites	.028	.263	.085	1.25
n	(2215)			
Enrolled	.039	.332	.075	1.56
n	(1066)			
Non-enrolled	.021	.199	.101	1.06
n	(1149)			
Educ.0-11	.037	.295	.118	1.07
12	.015	.161	.088	1.05
>13	.010	.134	.073	1.06
Young Blacks	.065	.435	.116	1.28
n	(805)			
Enrolled	.085	.521	.094	1.73
n	(328)			
Non-enrolled	.056	.375	.136	1.09
n	(477)			
Mature Whites	.016	.081	.187	1.03
n	(2225)			
Educ.0-11	.021	.104	.196	1.04
12	.009	.061	.147	1.02
>13	.009	.041	.202	1.02
Mature Blacks	.023	.120	.181	1.06
n	(1017)			

Percent Differentials

	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Blacks minus Young Whites	.836	.502	.308	.025
Enrolled	.780	.451	.233	.101
Non-enrolled	.966	.633	.300	.031
Young Whites minus Mature Whites	.585	1.18	-.790	.193
Non-enrolled Young Whites minus Mature Whites	.307	.902	-.621	.024
Young Blacks minus Mature Blacks	1.04	1.29	-.445	.197
Non-enrolled Young Blacks minus Mature Blacks	.893	1.14	-.283	.034
Mature Blacks minus Mature Whites	.380	.394	-.037	.021
Education:				
Less than H.S. minus H.S.				
Non-enrolled Wh.	.923	.608	.297	.017
Mature Whites	.850	.537	.292	.014
H.S. minus >H.S.				
Non-enrolled	.353	.179	.184	-.013
Mature Whites	.060	.388	-.319	.000

TABLE 4

DECOMPOSITION OF INCIDENCE DURATION AND NON-PARTICIPATION, 1967-69 (INCLUDES TEMPORARY LAYOFFS)

Levels

	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Whites	.030	.288	.082	1.25
n	(2215)			
Enrolled	.040	.342	.074	1.56
n	(1066)			
Non-enrolled	.023	.238	.092	1.06
n	(1149)			
Educ.0-11	.041	.337	.113	1.07
12	.016	.207	.076	1.05
>13	.0111	.153	.069	1.06
Young Blacks	.068	.463	.114	1.28
n	(805)			
Enrolled	.086	.527	.094	1.73
n	(328)			
Non-enrolled	.060	.419	.131	1.09
n	(477)			
Mature Whites	.022	.140	.150	1.03
n	(2225)			
Educ.0-11	.030	.177	.162	1.04
12	.012	.106	.111	1.02
>13	.012	.081	.151	1.02
Mature Blacks	.031	.199	.148	1.06
n	(1017)			

Percent Differentials

	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Blacks minus Young Whites	.829	.477	.325	.025
Enrolled	.771	.435	.236	.101
Non-enrolled	.945	.568	.344	.031
Young Whites minus Mature Whites	.308	.721	-.607	.193
Non-enrolled Young Whites minus Mature Whites	.067	.530	-.486	.024
Young Blacks minus Mature Blacks	.776	.847	-.267	.197
Non-enrolled Young Blacks minus Mature Blacks	.652	.747	-.128	.034
Mature Blacks minus Mature Whites	.360	.351	-.014	.021
Education:				
Less than H.S. minus H.S.				
Non-enrolled Wh.	.909	.488	.402	.017
Mature Whites	.898	.509	.372	.014
H.S. minus >H.S.				
Non-enrolled	.390	.301	.098	-.013
Mature Whites	-.024	.278	-.304	.000

Appendix

TABLE 5

DECOMPOSITION OF INCIDENCE DURATION AND NON-PARTICIPATION, 1969-71
(INCLUDES TEMPORARY LAYOFFS)

	Levels			
	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Whites	.055	.339	.184	.022
n	(2364)			
Enrolled	.077	.476	.120	1.36
n	(850)			
Non-enrolled	.045	.293	.143	1.06
n	(1514)			
Educ.0-11	.062	.376	.150	1.10
12	.046	.304	.143	1.06
>13	.027	.195	.132	1.04
Young Blacks	.094	.504	.159	1.18
n	(835)			
Enrolled	.128	.604	.148	1.43
n	(217)			
Non-enrolled	.085	.469	.164	1.11
n	(618)			
Mature Whites	.022	.110	.190	1.06
n	(2167)			
Educ.0-11	.027	.123	.208	1.07
12	.015	.100	.147	1.03
>13	.017	.086	.187	1.04
Mature Blacks	.094	.504	.159	1.18
n	(835)			

	Percent Differentials			
	U	$\frac{N}{L}$	$\bar{W}_u$	$\frac{1}{(1-\bar{W}_o)}$
Young Blacks minus Young Whites	.545	.339	.184	.022
Enrolled	.500	.257	.214	.052
Non-enrolled	.647	.470	.132	.044
Young Whites minus Mature Whites	.909	1.18	-.364	.087
Non-enrolled Young Whites minus Mature Whites	.707	.982	-.283	.006
Young Blacks minus Mature Blacks	1.02	1.26	-.328	.091
Non-enrolled Young Blacks minus Mature Blacks	.924	1.19	-.298	.032
Mature Blacks minus Mature Whites	.429	.262	.147	.018
Education:				
Less than H.S. minus H.S.				
Non-enrolled Wh.	.305	.215	.042	.036
Mature Whites	.596	.212	.346	.039
H.S. minus >H.S.				
Non-enrolled	.533	.442	.084	.018
Mature Whites	.101	.148	-.240	-.009

Append'

TAB/

INCIDENCE OF UNEMPLOYMENT IN 1967-69 BY TENURE
(INCLUDES TEMPORARY LAYOFFS)

Tenure as of 1967	Young White Men			Young Black Men			Mature White Men			Mature Black Men		
	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)
0	.295	.716	.412	.494	.795	.621	.337	.565	.576	.368	.576	.640
1	.184	.493	.373	.270	.635	.426	.160	.354	.451	.212	.348	.609
2	.187	.473	.394	.154	.308	.500	.167	.292	.500	.367	.433	.846
3	.100	.311	.321	.269	.615	.438	.093	.227	.412	.292	.333	.875
4	.096	.327	.294	.182	.636	.286	.123	.308	.400	.143	.214	.667
5	.077	.462	.167	.500	.667	.750	.133	.200	.667	.258	.452	.571
6	.059	.118	.500	.000	.333	.000	.085	.170	.500	.154	.231	.667
7	.125	.250	.500	.000	.500	.000	.091	.242	.375	.250	.300	.833
8	.200	.600	.333	.000	.333	.000	.172	.241	.714	.241	.276	.875
9	1.00	1.00	1.00	-	-	-	.100	.225	.444	.059	.176	.333
10-14	.500	.500	1.00	.750	.750	1.00	.078	.139	.564	.083	.147	.562
15-19							.081	.140	.553	.120	.134	.842
20-24							.096	.116	.793	.130	.194	.667
>25							.076	.133	.536	.145	.218	.630
Total	.219	.558	.392	.388	.690	.562	.126	.223	.547	.182	.266	.675
n	(1065)		(594)	(410)		(283)	(2084)		(464)	(892)		(237)

Note: (a) P(S) equals the probability of separating or of being temporarily laidoff from the job held at the the beginning of the period.

(b) Sample size becomes very small for young whites and blacks at seven and four years of tenure respectively.

TABLE 7

INCIDENCE OF UNEMPLOYMENT IN 1969-71 BY TENURE, NLS (EXCLUDING TEMPORARY LAYOFFS)

Tenure as of 1969	Young White Men[a]			Young Black Men[a]			Mature White Men			Mature Black Men		
	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)	P(U)	P(S)	P(U/S)
0	.351	.600	.586	.444	.647	.686	.252	.447	.556	.192	.416	.461
1	.195	.418	.467	.345	.536	.644	.081	.184	.419	.123	.217	.565
2	.120	.267	.450	.269	.385	.700	-	-	-	-	-	-
3	.164	.262	.625	.033	.233	.143	.072	.217	.333	.175	.300	.583
4	.087	.217	.400	.087	.174	.500	.114	.143	.800	.000	.111	.000
5	.068	.186	.364	.100	.300	.333	.038	.135	.286	.000	.188	.000
6	.029	.143	.200	.000	.200	.000	.000	.086	.000	.125	.208	.600
7	.071	.214	.333	.250	.250	1.00	.026	.103	.250	.059	.412	.143
8	.000	.125	.000	.000	.333	.000	.023	.136	.167	.125	.125	1.00
9	.154	.231	.667	.000	1.00	.000	.038	.115	.333	.000	.091	.000
10-14	.000	.250	.000	.000	.000	-	.030	.104	.286	.062	.112	.556
15-19				.500	.500	1.00	.039	.108	.360	.044	.104	.417
20-24							.030	.098	.304	.029	.096	.300
>25							.024	.136	.176	.035	.124	.286
Total	.229	.426	.538	.347	.532	.652	.077	.186	.410	.096	.217	.442
n	1328		481		256		1957			866		

a - not enrolled

TABLE 8

SAMPLE MEANS FOR TURNOVER AND UNEMPLOYMENT REGRESSIONS

	NLS 1969-71				MID 1975-76
	Young Whites	Mature Whites	Young Blacks	Mature Blacks	
X	4.63	35.64	4.45	37.02	18.65
X^2	33.31	1317.16	30.05	1424.30	515.59
T	1.61	13.15	1.10	10.89	7.18
T^2	6.95	313.83	4.84	236.73	112.13
JTRAIN	.145	-	.081	-	-
PTRAIN	.167	-	.066	-	-
GTRAIN	.289	-	.190	-	-
LOCRATE	4.88	3.80	5.24	4.35	8.38
PSEP	3.81	.496	4.19	.570	.093
PCOND	.163	.068	.328	.111	.113
EDUC	12.21	10.53	10.35	7.31	12.65
HLTH	.042	.222	.020	.192	.074
GOV	.114	.187	.109	.231	.196
UNION	.318	.378	.323	.457	.308
MARRY	.626	.912	.448	.800	.908
PTIME	.137	.086	.167	.137	.030
OLF	.328	.200	.405	.253	-
POLF	-	-	-	-	.051
SEP	.852	.278	1.01	.323	-
SEP	2.63	.5411	2.73	.589	-
ENTRY	.472	-	.601	-	-
n	1351	1957	504	866	1562

TABLE 9

THE DETERMINANTS OF JOB SEPARATION, 1969-71, YOUNG WHITE MEN, NLS (INCLUDING TEMPORARY LAYOFFS)

	B	t	B	t	B	t
	(1)		(2)		(3)	
CONST	1.17		.757		1.60	
X	-.101	2.99	.078	2.15	.060	1.58
X^2	.006	2.28	-.004	1.59	-.004	1.38
T			-.307	6.40	-.218	4.65
T^2			.026	4.08	.018	2.97
JTRAIN			-.281	2.64	-.128	1.24
PTRAIN			.102	.995	.106	1.09
GTRAIN			.011	.130	.090	1.12
LOCRATE			.015	.616	.005	.217
PSEP			.044	5.15	.040	4.97
PCOND			.182	2.23	.076	.966
EDUC					-.072	4.32
HLTH					-.118	.679
GOV					-.115	1.02
UNION					-.077	1.03
MARRY					-.244	3.08
PTIME					.258	2.55
OLF					.612	7.98
$\bar{R}^2$	.007		.110		.183	
$\bar{X}$	.906					
n	1351					

TABLE 1[illegible]

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT 1969-71, YOUNG WHITE MEN, NLS (INCLUDING TEMPORARY LAYOFFS)

	B	t	B	t	B	t	B	t	B	t
	(1)		(2)		(3)		(4)		(5)	
CONST	.687		.123		.749		.107		.082	
X	-.060	2.24	.043	1.50	.031	1.04	.004	.161		
X^2	.003	1.34	-.003	1.38	-.003	1.28	-.001	.776		
T			-.167	4.42	-.116	3.10	-.023	.781		
T^2			.014	2.73	.009	1.94	.002	.452		
JTRAIN			-.116	1.38	-.016	.187	.038	.592		
PTRAIN			.136	1.67	.133	1.69	.092	1.49		
GTRAIN			-.022	.346	.037	.573	-.018	.358		
LOCRATE			.063	3.29	.052	2.84	.052	3.55		
PSEP			.028	4.20	.257	3.94	.008	1.57		
PCOND			.279	4.32	.200	3.17	.187	3.80		
EDUC					-.051	3.84	-.022	2.11		
HLTH					-.033	.237	.084	.771		
GOV					-.101	1.12	-.053	.755		
UNION					.159	2.66	.223	4.76		
MARRY					-.224	3.55	-.090	1.82		
PTIME					.134	1.66	-.137	.214		
OLF					.354	5.77	-	-		
SEP							.334	10.43	.371	11.78
SEP^2							.026	5.54	.023	4.89
ENTRY							.058	1.98	.100	3.39
$\bar{R}^2$	.007		.089		.146		.478		.450	
$\bar{X}$	.506									
n	1351									

TABLE 11

THE DETERMINANTS OF JOB TURNOVER 1969-71, MATURE WHITE MEN, NLS (INCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t
	(1)		(2)		(3)	
CONST	.517		.541		.377	
X	-.021	1.81	-.017	1.70	-.007	.775
X^2	.0004	2.30	.0003	2.00	.000	.693
T			-.020	5.14	-.016	4.40
T^2			.0005	4.26	.0004	3.55
LOCRATE			-.002	.190	-.001	.173
PSEP			.180	18.59	.166	18.07
PCOND			.099	2.80	.037	1.10
EDUC					.002	.476
HLTH					.060	1.86
GOV					-.096	2.82
UNION					.040	1.44
MARRY					-.066	1.41
PTIME					.085	1.82
OLF						14.12
$\bar{R}^2$	.004		.241		.325	
$\bar{X}$	.301					
n	1957					

TABLE 1

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT, 1969-71, MATURE WHITE MEN, NLS
(INCLUDES TEMPORARY LAYOFFS)

	(1) B	(1) t	(2) B	(2) t	(3) B	(3) t	(4) B	(4) t	(5) B	(5) t
CONST	.287		.306		.350		.241		.028	
X	-.012	1.51	-.011	1.48	-.011	1.48	-.009	1.45		
X^2	.0002	1.75	.0002	1.60	.0002	1.47	.0001	1.56		
T			-.008	2.77	-.007	2.54	-.002	1.00		
T^2			.0002	1.88	.0001	1.53	.000	.152		
LOCRATE			-.004	.641	-.004	.619	-.006	1.18		
PSEP			.101	14.21	.097	13.68	.020	3.18		
PCOND			.116	4.47	.102	3.90	.094	4.41		
EDUC					.001	.399	.0003	.126		
HLTH					.003	.110	-.008	.395		
GOV					-.080	3.04	-.045	2.10		
UNION					.048	2.24	.036	2.09		
MARRY					-.064	1.80	-.040	1.36		
PTIME					-.003	.084	-.032	1.10		
OLF					.084	3.19	-.097	4.16		
SEP							.259	9.77	.258	10.80
SEP^2							.058	8.39	.065	9.66
$\bar{R}^2$	.001		.162		.173		.453		.434	
$\bar{X}$	.135									
n	1957									

TABLE 12

THE DETERMINANTS OF JOB SEPARATIONS, 1969-71, YOUNG BLACK MEN, NLS (INCLUDING TEMPORARY LAYOFFS)

	(1)		(2)		(3)	
	B	t	B	t	B	t
CONST	1.39		.514		.607	
X	-.069	1.20	.125	1.99	.141	2.30
X^2	-.000	.000	-.012	2.40	-.013	2.78
T			-.208	3.42	-.138	2.35
T^2			.018	2.94	.012	2.06
JTRAIN			-.168	.829	-.060	.306
PTRAIN			.186	.818	.300	1.37
GTRAIN			.120	.843	.250	1.81
LOCRATE			.021	.671	[illegible]	.379
PSEP			.069	4.69	.073	5.22
PCOND			.288	2.92	.259	2.66
EDUC					-.024	1.15
HLTH					-.328	.868
GOV					-.374	2.15
UNION					-.486	4.23
MARRY					-.001	.000
PTIME					.366	2.58
OLF					.538	4.96
$\bar{R}^2$	.025		.127		.213	
$\bar{X}$	1.08					
n	504					

Appendix

TABLE 14

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT, 1969-71, YOUNG BLACK MEN, NLS (INCLUDING TEMPORARY LAYOFFS)

	B	t	B	t	B	t	B	t	B	t
	(1)		(2)		(3)		(4)		(5)	
CONST	.998		.262		-.024		-.159		.166	
X	-.041	.810	.113	1.98	.158	2.81	.082	1.69		
X^2	-.001	.290	-.011	2.44	-.014	3.11	-.006	1.82		
T			-.182	3.29	-.132	2.46	-.060	1.30		
T^2			.017	2.98	.013	2.45	.007	1.52		
JTRAIN			.230	1.25	.299	1.67	.316	2.06		
PTRAIN			.150	1.17	.205	1.62	.041	.239		
GTRAIN			.154	.748	.156	.783	.080	.738		
LOCRATE			.024	.875	.027	.992	.025	1.09		
PSEP			.044	3.30	.049	3.87	.013	1.15		
PCOND			.286	3.19	.199	2.24	.078	1.01		
EDUC					.003	.122	.007	.436		
HLTH					.803	2.32	.937	3.17		
GOV					-.186	1.17	.028	.200		
UNION					-.182	1.73	.063	.694		
MARRY					-.242	2.35	.259	2.96		
PTIME					.209	1.61	.029	.263		
OLF					.532	5.38	-	-		
SEP							.516	7.02	.563	7.90
SEP^2							-.740	.531	-.011	.791
ENTRY							.909	1.79	.118	2.35
$\bar{R}^2$	.020		.100		.178		.401		.379	
$\bar{X}$	.778									
n	504									

TABLE 15

THE DETERMINANTS OF JOB TURNOVER, 1969-71, MATURE BLACK MEN, NLS
(EXCLUDES TEMPORARY LAYOFFS)

	(1)		(2)		(3)	
	B	t	B	t	B	t
CONST	.588		.376		.231	
X	-.034	2.16	-.022	1.52	-.012	.869
X^2	.001	3.07	.001	2.43	.0003	1.48
T			-.019	2.86	-.011	1.69
T^2			.0004	1.71	.000	.794
LOCRATE			.018	1.48	.010	.835
PSEP			.120	7.47	.098	6.41
PCOND			.076	1.56	.082	1.78
EDUC					-.003	.578
HLTH					.089	1.68
GOV					-.020	.390
UNION					-.037	.871
MARRY					-.035	.686
PTIME					.253	4.08
OLF					.426	8.67
$\bar{R}^2$	.028		.167		.260	
$\bar{X}$	.323					
n	866					

TABLE 16

THE DETERMINANTS OF SPELLS OF UNEMPLOYMENT, 1969-71, MATURE BLACK MEN, NLS (EXCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t	B	t	B	t	INCIDENCE AMONG SEPARATORS B	t
	(1)		(2)		(3)		(4)		(5)		(6)	
CONST	.373		-.017	1.68	.241		.135		.009		.750	
X	-.022	2.10	.0003	2.20	-.015	1.49	-.009	1.20		11.51	-.008	.427
X^2	.0004	2.63	-.004	.870	.0003	1.81	.0001	1.12		.800	.000	.409
T			-.004	.870	-.001	.013	.004	1.22			.002	.219
T^2			.000	.122	-.000	.043	-.0001	1.21			-.000	.499
LOCRATE			.150	1.77	.011	1.23	.006	.906			-.000	.000
PSEP			.055	4.91	.048	4.40	.003	.386			.016	.883
PCOND			.059	1.77	.056	1.70	.019	.728			-.009	.164
EDUC					-.003	.616	-.001	.332			-.004	.385
HLTH					.043	1.15	.002	.009			-.018	.217
GOV					-.026	.685	-.016	.573			-.050	.492
UNION					-.027	.934	-.116	.490			-.013	.176
MARRY					-.006	.158	.010	.360			-.049	.611
PTIME					.130	2.94	.015	.422			.063	.754
OLF					.091	2.57	-.104	3.60			-.246	3.31
SEP							.458	11.38	-.415			
SEP^2							.000	.000	.010			
$\bar{R}^2$	.012		.080		.097		.464		.461		.012	
$\bar{\bar{X}}$	.132										.415	
n	866										200	

TABLE 1

THE DETERMINANTS OF THE PROBABILITY OF SEPARATING, 1969-71, YOUNG WHITE MEN, NLS (EXCLUDES TEMPORARY LAYOFFS)

	B	t	B	t	B	t
	(1)		(2)		(3)	
CONST	.567		.471		.660	
X	-.054	4.46	.007	.513	.000	.000
X^2	.003	3.44	-.000	.253	.000	.100
T			-.134	7.90	-.101	6.08
T^2			.011	4.75	.007	3.49
JTRAIN			-.126	3.34	-.078	2.13
ITRAIN			.006	.182	.009	.268
GTRAIN			-.019	.656	.004	.145
LOCRATE			.016	1.89	.013	1.61
PSEP			.004	1.38	.003	1.12
PCOND			.039	1.36	.008	.290
EDUC					-.017	2.96
HLTH					.019	.300
GOV					-.072	1.81
UNION					-.087	3.28
MARRY					-.054	1.93
PTIME					.058	1.61
OLF					.243	8.96
$\bar{R}^2$	.017		.116		.187	
$\bar{X}$	.429					
n	1351					

TABLE 1

THE DETERMINANTS OF THE INCIDENCE OF UNEMPLOYMENT, 1969-71, YOUNG WHITE MEN, NLS (EXCLUDES TEMPORARY LAYOFFS)

	(1)		(2)		(3)		(4)		(5)	
	B	t	B	t	B	t	B	t	B	t
CONST	.316		.110		.331		.040		.018	
X	-.026	2.48	.015	1.31	.011	.962	.004	.042		
X^2	.001	1.34	-.001	1.38	-.001	1.29	-.001	1.02		
T			-.075	5.11	-.047	3.32	-.002	.182		
T^2			.006	3.08	.004	1.90	-.000	.110		
JTRAIN			-.035	1.07	.010	.332	.040	1.56		
PTRAIN			.030	.959	.031	1.02	.015	.640		
GTRAIN			-.022	.877	.001	.003	-.004	.224		
LOCRATE			.028	3.76	.024	3.42	.020	3.59		
PSEP			.007	2.66	.006	2.42	-.000	.000		
PCOND			.125	5.00	.092	3.80	.078	4.00		
EDUC					-.020	3.86	-.008	2.06		
HLTH					.005	.009	.031	.727		
GOV					-.034	.997	-.011	.401		
UNION					-.002	.100	.040	2.18		
MARRY					-.086	3.57	-.049	2.52		
PTIME					.063	2.05	.022	.900		
OLF					.197	8.41	-	-		
SEP							.287	22.73	.299	24.25
SEP^2							-.021	11.70	-.022	12.19
ENTRY							.029	2.51	.043	3.70
$\bar{R}^2$	.010		.098		.174		.462		.442	
$\bar{X}$	.234									
n	1351									

Appendix

TABLE 1c

THE DETERMINANTS OF QUIT AND QUIT UNEMPLOYMENT, WHITE MEN

	NLS Young Men 1969-71				NLS Mature Men 1969-71				MID 1975-76			
	B P(Q) (1)	t	B P(unQ) (2)	t	B P(Q) (3)	t	B P(unQ) (4)	t	B P(Q) (5)	t	B P(unQ) (6)	t
CONST	.432		.197		.002		-.015		.273		.122	
X	-.018	1.43	-.004	.412	-.000	.000	.003	1.11	-.004	1.68	-.001	.922
X^2	.001	1.42	.0001	.212	.000	.499	-.000	.894	.0001	1.19	.000	.592
T	-.047	2.97	-.014	1.25	-.006	3.05	-.002	2.04	-.008	2.65	-.003	1.52
T^2	.003	1.37	.001	.458	.0002	3.10	.00004	1.27	.0002	1.90	.0001	1.11
JTRAIN	-.085	2.46	-.007	.266	-		-		-		-	
PTRAIN	.004	.122	.017	.700	-		-		-		-	
GTRAIN	-.045	1.65	-.033	1.69	-		-		-		-	
LOCRATE	.004	.537	.003	.488	.002	.528	-.002	.848	-.002	.650	-.0001	.100
PSEP	-.0004	.134	.002	.807	.003	.632	.005	1.97	.170	3.98	.114	3.71
PCOND	-.065	2.42	-.007	.377	.0004	.003	.032	3.58			.041	1.58
EDUC	-.005	.800	-.006	1.24	.003	1.28	.002	1.65	-.009	3.09	-.006	3.22
HLTH	.013	.200	-.014	.332	.043	2.70	.008	.093	.033	1.16	-.008	.436
GOV	-.002	.006	-.007	.247	.004	.224	-.013	1.41	-.036	1.96	-.016	1.27
UNION	-.141	5.57	-.054	2.92	-.058	4.20	-.023	3.15	-.027	1.64	-.009	.781
MARRY	-.030	1.16	-.064	3.28	-.004	.161	-.013	1.10	-.674	2.62	-.035	2.00
PTIME	.020	.574	.035	1.40	.003	.145	-.002	.152	.002	2.54	.001	2.17
OLF	.222	8.50	.185	9.72	.300	17.70	.014	1.60	-		-	
POLF									-.055	1.56	.005	.224
$\bar{R}^2$	.117		.112		.176		.028		.066		.048	
$\bar{X}$	.271		.118		.109		.023		.086		.036	
n	1297		1297		1928		1928		1454		1454	

P(Q) equals the probability of quitting the job held at the beginning of the interval.

P(unQ) equals the probability of quitting the job held at the beginning of the interval and experiencing unemployment during the interval.

TABLE 20

THE DETERMINANTS OF LAYOFF AND LAYOFF UNEMPLOYMENT, WHITE MEN

	NLS YOUNG MEN 1969-71				NLS MATURE MEN 1969-71				MID 1975-76			
	P(L)		P(unL)		P(L)		P(unL)		P(L)		P(unL)	
	B	t	B	t	B	t	B	t	B	t	B	t
	(1)		(2)		(3)		(4)		(5)		(6)	
CONST	.184		.127		.112		.087		.175		.167	
X	.021	2.08	.017	1.85	.001	.219	-.001	.346	-.004	2.01	-.001	.781
X^2	-.001	1.82	-.001	1.93	-.000	.458	.000	.017	.0001	1.41	.000	.200
T	-.052	4.10	-.037	3.30	-.004	2.27	-.003	1.95	-.005	1.81	-.003	1.25
T^2	.004	2.81	.003	2.22	.0001	1.50	.0001	1.30	.0001	1.02	.000	.583
JTRAIN	.014	.492	.025	1.02	-		-		-		-	
MTRAIN	.008	.316	.008	.332	-		-		-		-	
GTRAIN	.046	2.13	.033	1.71	-		-		-		-	
LOCRATE	.011	1.72	.019	3.32	.0005	.138	.003	.954	.003	1.56	.002	1.46
PSEP	.004	2.05	.004	2.10	.053	13.27	.040	11.80				
PCOND	.083	3.86	.092	4.77	.014	.985	.008	.693	.137	4.04	.166	6.19
EDUC	-.013	2.95	-.014	3.46	-.001	.714	.0002	.141	-.003	1.12	-.004	1.96
HLTH	.021	.435	.036	.825	-.009	.648	-.011	.949	.081	3.02	.062	2.84
GOV	-.061	2.00	-.031	1.16	-.045	3.08	-.031	2.49	.003	.173	-.011	.818
UNION	.050	2.46	.050	2.76	.009	.794	.010	1.02	-.002	.141	-.008	.671
MARRY	-.011	.496	-.012	.608	-.036	1.80	-.028	1.67	-.031	1.25	-.065	3.30
PTIME	.034	1.23	.031	1.26	.027	1.32	-.001	.005	-.073	1.75	-.044	1.26
OLF	.029	1.40	.022	1.17	.111	7.60	.066	5.28	-		-	
POLF	-		-		-		-		-.027	.818	.012	.436
$\bar{R}^2$	.082		.088		.178		.128		.047		.068	
$\bar{X}$	.1411		.110		.079		.053		.075		.044	
n	1297		1297		1928		1928		1437		1437	

P(L) equals the probability of being laid off from the job held at the beginning of the interval.

P(unL) equals the probability of being laid off from the job held at the beginning of the interval and experiencing unemployment during the interval.

Why Does the Rate of Youth Labor Force Activity Differ Across Surveys?

Richard B. Freeman
J.L. Medoff

One prerequisite for analysis of the economic problem of youth is a set of sound estimates of the employment and labor force status of the young. Yet, existing estimates of the extent of labor market involvement and the extent of work activity of the young based on the monthly Current Population Survey (CPS), the source of official government figures on this subject, and from special longitudinal surveys of the young, notably the National Longitudinal Survey of Young Men (NLS) and the National Longitudinal Survey of the High School Class of 1972 (NLS72), give strikingly different pictures of the labor market for young men.[1] Labor force participation rates, employment to population ratios and weeks worked are noticeably higher in both longitudinal surveys than in the CPS. Unemployment rates differ significantly but are neither higher nor lower consistently across surveys.

The differences in the recorded activity rates constitute a major problem in evaluating the magnitude and nature of the labor force problem for young men. If the CPS data are incorrect, and understate the employment to population ratio for young individuals, standard discussions of youth employment problems are exaggerated. If the longitudinal data are incorrect, studies which use the longitudinal surveys to ascertain the causes and effects of the youth employment problem may be invalid. What explains the large differences in rates of male youth labor force activity found in the different surveys? Can the observed differences be traced to specific differences in survey procedures or questions?

The purpose of this study is to answer these questions by providing a detailed quantitative analysis of the divergences between the rates of labor force activity for male youths indicated by these surveys. Section I describes the three surveys providing the youth labor force information on which we focus: the CPS, NLS, and NLS72. The second section compares the labor force participation rates, ratios of employment to population, rates of unemployment, and rates of school enrollment given by the surveys. Section III uses a matched mother-son sample drawn from the NLS and other information to examine three potential causes of survey differences: (1) the fact that youths report their own activity in the NLS and NLS72 while parents or other adults typically report the activities of youths in the CPS; (2) differences in the samples studied; and (3) differences in the survey methods employed. In the fourth section, some suggestions for further investigations of alternative measures of the employment of young persons are offered.

Our analysis indicates that there are significant differences between rates of activity for young males calculated with surveys in which young people respond for themselves and those calculated with surveys in which they are unlikely to do so. Of particular importance is the fact that the responses of young male self-respondents imply a significantly higher employment to population ratio than is implied by the responses of proxy-respondents. Who is questioned about the activity of young men appears to be a major determinant of the responses obtained, which raises important questions about current ways of obtaining information about the youth joblessness problem.

I. Survey Procedures and Questions

In this section we compare the questions asked and survey methods employed in the CPS, NLS, and NLS72. Each of the surveys seeks information about labor force activity, weeks worked in the previous year, and enrollment in school. While the questions are reasonably similar across surveys, the survey methods, in particular the relative importance of proxy versus self-responses, differ. These differences must be understood if the large disparities in the picture of the youth labor market given by the surveys are to be explained.

The CPS[2] interviews approximately 56,000 households (47,000 before July 1975) using a stratified sample. Part of the sample is changed each month to avoid problems of noncooperation when a person is interviewed for many months in a row. The method of rotation of the sample is such that a group will be interviewed for 4 consecutive months one year, deleted from the CPS for 8 months and then interviewed in the same 4 months of the following year. As a result, 75 percent of the sample is common from month to month and 50 percent is common from year to year. Each month, during the calendar week containing the 19th day, interviewers contact some "responsible person" in each of the sample households. Personal visits are used to obtain 90 percent or more of the responses in the first and fifth month that the household is in the sample and about 50 to 60 percent in the second month; in other months more than 75 percent of the responses come from telephone interviews. Roughly half of the households in any month are interviewed by phone. Though the questions are asked for every individual in the household, it is important to understand that young individuals do not usually respond for themselves. This is because one "responsible person" per family, usually not a teen,[3] answers for every household member.

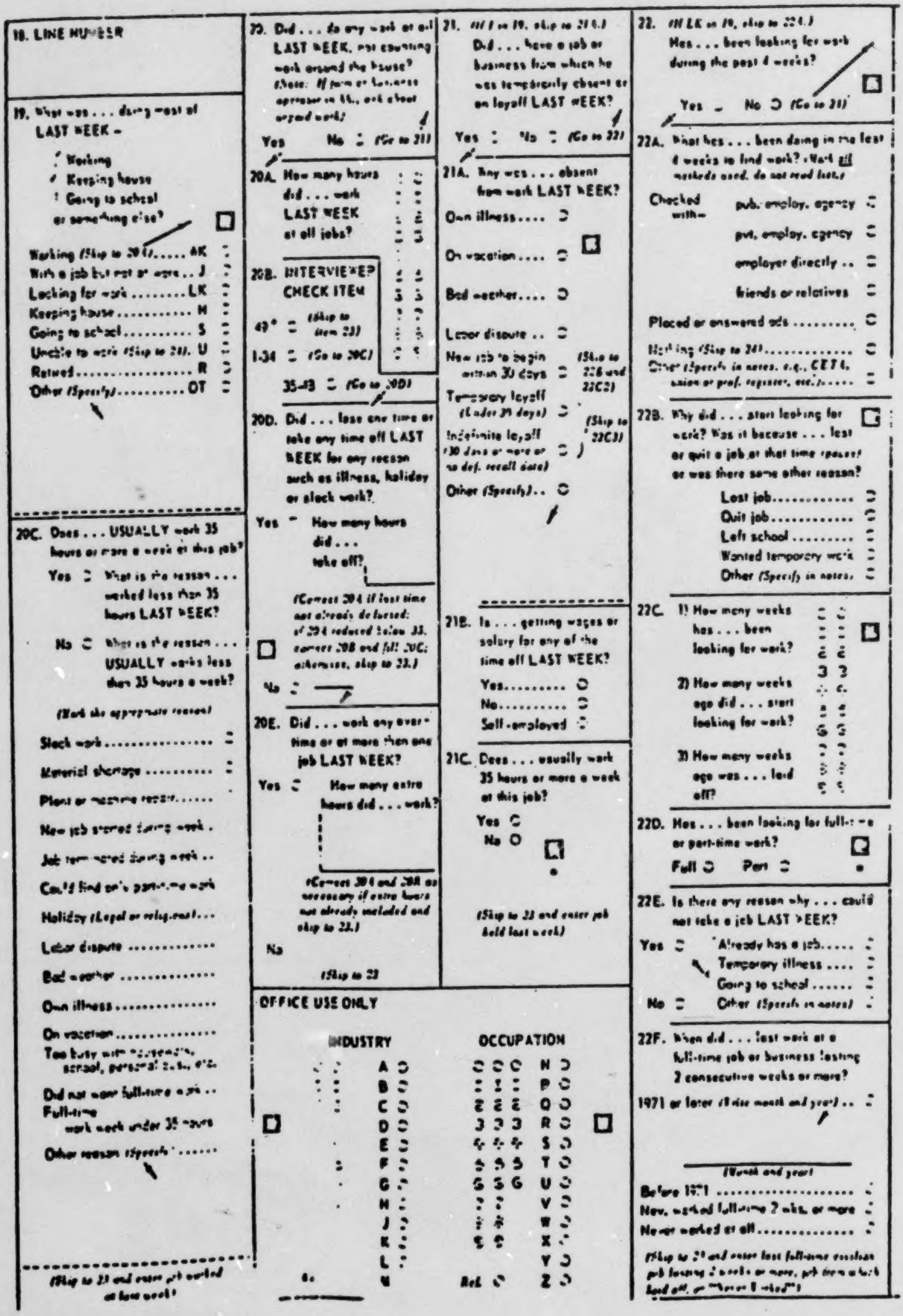
Tabulated results from the CPS are derived by using responses to calculate a "composite estimate" of the status of individuals by taking the unweighted mean of two separate estimates: the "actual" value for the current month and a figure obtained by adding to the preceding month's composite estimate the change in the actual value of each item between the preceding month and the present month based on the part of the sample that is common to both months. By using raw data for most of our analysis we have taken into account the possible bias caused by this procedure.

To determine the labor force status of an individual, the CPS asks a standard set of interrelated questions which are designed to classify a person as a member of one of three categories: employed, unemployed, and out of the labor force. Figure 1 gives this set of questions from the CPS survey.

To determine weeks worked over the previous year the CPS asks (in its March questionnaire only):

> In 19__ how many weeks did . . . work either full time or part time not counting work around the house? Include paid vacation and paid sick leave.

Figure 1: The CPS Labor Force Questions



18. LINE NUMBER

19. What was . . . doing most of LAST WEEK –

Working

Keeping house

Going to school

or something else?

☐

Working (Skip to 20A) ..... WK

With a job but not at work .. J

Looking for work .... LK

Keeping house .... H

Going to school .... S

Unable to work (Skip to 24). U

Retired .... R

Other (Specify) .... OT

20C. Does . . . USUALLY work 35 hours or more a week at this job?

Yes ○ What is the reason . . . worked less than 35 hours LAST WEEK?

No ○ What is the reason . . . USUALLY works less than 35 hours a week?

(Mark the appropriate reason)

Slack work ....

Material shortage ....

Plant or machine repair......

New job started during week .

Job terminated during week ..

Could find only part-time work

Holiday (Legal or religious)...

Labor dispute ....

Bad weather ....

Own illness ....

On vacation ....

Too busy with housework, school, personal bus., etc.

Did not want full-time work ..

Full-time work week under 35 hours

Other reason (Specify) ......

(Skip to 23 and enter job worked at last week)

20. Did . . . do any work at all LAST WEEK, not counting work around the house? (Note: If farm or business operator in hh., ask about unpaid work.)

Yes No ○ (Go to 21)

20A. How many hours did . . . work LAST WEEK at all jobs?

20B. INTERVIEWER CHECK ITEM

49+ ○ (Skip to item 23)

1-34 ○ (Go to 20C)

35-48 ○ (Go to 20D)

20D. Did . . . lose any time or take any time off LAST WEEK for any reason such as illness, holiday or slack work?

Yes ○ How many hours did . . . take off?

(Correct 20A if lost time not already deducted; if 20A reduced below 35, correct 20B and fill 20C; otherwise, skip to 23.)

☐

No ○

20E. Did . . . work any overtime or at more than one job LAST WEEK?

Yes ○ How many extra hours did . . . work?

(Correct 20A and 20B as necessary if extra hours not already included and skip to 23.)

No

(Skip to 23

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A ○ B ○ C ○ D ○ E ○ F ○ G ○ H ○ J ○ K ○ L ○ M

☐

OCCUPATION

N ○ P ○ Q ○ R ○ S ○ T ○ U ○ V ○ W ○ X ○ Y ○ Z ○

Ref. ○

☐

21. (If J in 19, skip to 21A.)

Did . . . have a job or business from which he was temporarily absent or on layoff LAST WEEK?

Yes ○ No ○ (Go to 22)

21A. Why was . . . absent from work LAST WEEK?

Own illness .... ○

On vacation .... ○

☐

Bad weather.... ○

Labor dispute .. ○

New job to begin within 30 days ○ (Skip to 22B and 22C2)

Temporary layoff (Under 30 days) ○

Indefinite layoff (30 days or more or no def. recall date) ○ (Skip to 22C3)

Other (Specify) .. ○

21B. Is . . . getting wages or salary for any of the time off LAST WEEK?

Yes......... ○

No.......... ○

Self-employed ○

21C. Does . . . usually work 35 hours or more a week at this job?

Yes ○

No ○

☐

(Skip to 23 and enter job held last week)

22. (If LK in 19, skip to 22A.)

Has . . . been looking for work during the past 4 weeks?

☐

Yes ○ No ○ (Go to 24)

22A. What has . . . been doing in the last 4 weeks to find work? (Mark all methods used, do not read list.)

Checked with–

pub. employ. agency ○

pvt. employ. agency ○

employer directly .. ○

friends or relatives ○

Placed or answered ads .... ○

Nothing (Skip to 24)............. ○

Other (Specify in notes, e.g., CETA, union or prof. register, etc.)..... ○

22B. Why did . . . start looking for work? Was it because . . . lost or quit a job at that time (pause) or was there some other reason?

☐

Lost job............ ○

Quit job............ ○

Left school .... ○

Wanted temporary work ○

Other (Specify in notes) ○

22C. 1) How many weeks has . . . been looking for work?

2) How many weeks ago did . . . start looking for work?

3) How many weeks ago was . . . laid off?

☐

22D. Has . . . been looking for full-time or part-time work?

☐

Full ○ Part ○

22E. Is there any reason why . . . could not take a job LAST WEEK?

Yes ○ Already has a job..... ○

Temporary illness .... ○

Going to school ...... ○

No ○ Other (Specify in notes) ○

22F. When did . . . last work at a full-time job or business lasting 2 consecutive weeks or more?

1971 or later (Enter month and year) .. ○

(Month and year)

Before 1971 .... ○

Nev. worked full-time 2 wks. or more ○

Never worked at all............... ○

(Skip to 24 and enter last full-time civilian job lasting 2 weeks or more, job from which laid off, or "Never Worked")

The CPS has two questions regarding enrollment in school. Each October the CPS asks:

> Is . . . attending or enrolled in school?

In each month, the major activity question:

> What was . . .doing most of last week?

provides information on attendance at school (see question 19 in Figure 1).

The National Longitudinal Survey[5] is a survey that covers about 5,000 persons in several specified age groups: young men aged 14 to 24 in 1966 (more accurately, as of April 1, 1966); young women aged 14 to 24 in 1968; women between the ages of 30 and 44 in 1966; and men 45 to 59 in 1966. The original samples were chosen through a multi-stage probability sampling procedure. To ensure that reliable information on blacks could be derived from the surveys, this group was oversampled. The NLS interviews the same persons repeatedly as they age over a ten year period. In-person interviews were conducted from 1966 to 1971, telephone interviews were generally employed in 1973 and 1975, and no interviews were conducted in 1972 and 1974.

The weeks worked question in the NLS varies only slightly from that in the CPS:

> In how many different weeks did you work either full- or part-time in the last 12 months, (not counting work around the house)? Count any week where you did any work at all.....(Include paid vacations and paid sick leave.)

The NLS asks two questions to ascertain the enrollment status of individuals. At one point it inquires:

> Are you attending or enrolled in regular school?

At another point it asks a question regarding the major activity of the individual to which one answer is "going to school."

The NLS and CPS surveys are reasonably similar. Both are administered by experienced CPS interviewers. Both use the standard set of CPS labor force questions to determine whether a person is employed or out of the labor force. The NLS differs from the CPS, however, in that each individual in the NLS describes his/her own labor force experience rather than typically having it described by someone else in the household and in that the NLS is part of a larger battery of labor force questions.[6]

The NLS72 is a very different survey.[7] It is based on a stratified national probability sample of 1,200 high schools (later slightly amended) from which 18 persons in the class of 1972 per school were selected for the survey. An initial base year survey of students was administered followed by several "follow-up" questionnaires designed to track each individual's progress over time. Most of the information is obtained by mail, with between one quarter and one third of the respondents interviewed by telephone. The response rate to the NLS72 was extremely high, with 95.5 percent of an initial base group of 23,457 students responding to either the base-year or first follow-up questionnaires and with a large percentage responding to ensuing follow-up surveys.

To obtain information on the individual's labor force status in October 1972, the interviewer asked:

> Now please think back to about a year ago. Did you hold a job of any kind during the month of October 1972?
>
> Yes, same job as in October 1973...............1
> Yes, but different job than in October 1973....2
> No...3
>
> What were the reasons you were not working during the month of October 1972? (Circle one number on each line.)

	Applies to me	Does not apply to me
Did not want to work	1	2
On temporary layoff from work or waiting to report to work	1	2
Was full-time homemaker	1	2
Going to school	1	2
Not enough job openings available	1	2
Union restrictions	1	2
Would have required moving	1	2

Required work experience I did not have..........................1....2

Jobs available offered little opportunity for career development.1....2

Health problems or physical handicap.............................1....2

Could not arrange child care.....................................1....2

Other family responsibilities (including pregnancy)..............1....2

Waiting to enter or in Armed Forces..............................1....2

Not educationally qualified for types of work available..........1....2

Did you look for work during October 1972?

Yes................................1

No.................................2

To obtain information on the weeks worked by the individual in the year, the following question was asked:

> Each part of this question refers to the entire 52-week period from October 1972 to October 1973.
>
> About how many different weeks did you work altogether during this period? (Count all weeks in which you did any work at all or were on paid vacation.) ____________Number of weeks

To ascertain the enrollment status of the former high school seniors in October 1972 (a period for which comparable CPS data on the high school class of 1972 is available), the students were asked (in 1973):

> Now please think back a year to the Fall of 1972. Were you taking classes or courses at any school during the month of October 1972?
>
> Yes................................1
>
> No.................................2

To summarize, the CPS and NLS use roughly the same set of questions but employ survey methods which differ in a number of potentially important respects. It seems that the primary difference in interview procedures is that individuals self-report activity in the NLS but are often reported for by proxy-respondents in the CPS. The CPS and NLS72 differ in more fundamental ways, both in terms of questions and survey procedures. The NLS and NLS72 have one basic similarity: each seeks self-responses as opposed to proxy-responses.

II. Estimates of Differences in Youth Activity Among Surveys

This section documents the basic "fact" under study: the strikingly different rates of labor force activity reported for young males in the NLS and NLS72 from those in the CPS. Our study reveals generally large differences in employment to population ratios, labor force participation rates, and weeks worked, and occasionally substantial differences in unemployment rates. Basically, both the NLS and NLS72 show greater work activity among male youths than does the CPS.

CPS vs. NLS

First, we examine differences in the patterns of labor force and school activity for young males indicated by the CPS and the NLS. Table 1 compares the percentage of young persons in school, employment to population ratios, labor force participation rates, unemployment rates, and weeks worked, as defined by the Bureau of Labor Statistics, for males in the civilian, non-institutional population aged 16-17, 18-19, and 20-24 as indicated by the two surveys. The NLS figures are based on weighted counts of individuals interviewed in the 1966-71 surveys, with the number of respondents as given in the table. In addition to the NLS sampling weights, a second set of weights was applied to people of different ages to correct for a problem with reporting on the age of NLS respondents. Because NLS codes the age of respondents as of April 1 and interviews the respondents primarily in November,[2] there is a seven month lag between the reported age and the time of the employment status question. This lag means that roughly seven-twelfths of the sample changes years of age between when

Table 1: Comparison of Rates of School and Labor Force Activity for Young Men, 1966-1971: NLS vs. CPS

	No. in NLS Sample[a]	% in School[b]		Emp/Pop[c]		LFPR[c]		Unemployment[c]		Weeks Worked[d]	
		NLS	CPS	NLS	CPS	NLS	CPS	NLS	CPS	NLS	CPS
					TOTAL MALES						
16-17 yr. olds											
1966	1966	89.8	89.9	47.6	36.4	59.2	40.9	19.7	11.1	18.8	14.7
1967	1976	90.2	91.0	44.9	35.2	56.3	42.0	20.3	16.1	20.4	15.5
18-19 yr. olds											
1966	1519	61.8	57.8	63.5	54.2	71.0	59.9	10.5	9.6	29.2	24.4
1967	1622	63.0	56.3	62.3	52.3	70.5	59.5	11.6	12.1	29.3	24.8
1968	1619	59.0	60.4	64.2	54.3	70.3	59.8	8.7	9.2	30.0	25.2
1969	1621	59.6	59.4	60.9	56.3	70.0	61.9	13.1	9.2	29.8	30.4
20-24 yr. olds											
1966	2056	30.1	29.2	83.6	79.5	86.3	83.1	3.1	4.3	38.8	37.7
1967	1976	31.9	30.6	82.1	77.8	85.4	81.7	3.8	4.8	38.6	35.1
1968	1909	33.5	30.5	80.3	76.8	83.2	80.4	3.5	4.4	39.0	24.6
1969	1970	31.1	32.0	80.4	76.9	84.7	80.8	5.1	4.9	38.0	23.9
1970	2283	29.2	29.3	77.9	74.3	84.9	82.2	8.3	9.5	41.6	33.5
1971	2600	28.7	29.2	79.9	73.5	87.4	81.5	8.6	9.8	37.3	33.2

[a] The numbers in this column are unweighted counts of the observations used in generating the relevant row estimates. Thus, for example, the sixteen to seventeen year old figures includes all males who were fifteen to seventeen years old in April of the given year. The NLS numbers in all other columns are based on counts weighted in accordance with age. (See pages 8 and 10 for a discussion of the weighting procedure.)

[b] U.S. Bureau of the Census, Current Population Reports, Series P-20, "School Enrollment," October 1966-1971, numbers 167, 190, 206, 222, 241. Table: "Enrollment Status of the Population 3 to 34 Years Old, by Age, Race, Sex, and Selected Educational Characteristics, for the United States."

[c] U.S. Bureau of Labor Statistics, Employment and Earnings, December 1966-1971. Table: "Employment Status of the Noninstitutional Population by Age, Sex, and Color."

[d] U.S. Bureau of Labor Statistics, Work Experience of the Population, Special Labor Force Reports 91, 107, 115, 127, 141, 162. Table: "Age: Persons with Work Experience, by Sex."

their age is recorded and when their labor market status is ascertained. In light of this problem, we applied different weights to people of different recorded ages in the NLS (unless otherwise stated). These weights were chosen so that we could derive NLS figures for "X-Y" year olds which are comparable to CPS figures for "X-Y" year olds. For example, in constructing an NLS average for 16-17 year olds, we attached to 15 year olds a weight of 7/12 (the probability of their having turned 16 by the interview date), to 16 year olds (all of whom would be either 16 or 17) a weight of one, and to 17 year olds a weight of 5/12 (the probability of their not having turned 18 by the interview date). The final weight applied to a respondent in the NLS was the product of this weight and the individual's sampling weight.

The CPS data are obtained from published documents, with enrollment figures relating to November, and weeks worked information covering the calendar year. Because of the timing of the surveys, the NLS figures do not refer to the same time periods. While most of the NLS interviews [illegible] in November, some take place in the surrounding months. Also, while the NLS weeks worked question covers the preceding 12 months, the CPS question relates to the calendar year, creating a divergence of 1 to 2 months. While these slight differences in timing may have some effects, there is typically not wide enough variation in rates of activity across CPS surveys in the relevant months to suggest any major problems in comparison. We did, however, attach different weights to those of different ages (11/12 or 1/12 using the method described above) for the NLS weeks worked data because CPS weeks worked and age questions are asked in March while the NLS age pertains to April of the preceding year.

The figures in Table 1 reveal five differences between the NLS and CPS descriptions of youth activity:

First, and most important, the NLS indicates a much higher proportion of young males employed than does the CPS. The employment to population ratios diverge by 9.7 to 11.2 points among 16-17 years olds, by 4.6 to 10.0 points among 18-19 year olds, and by 3.5 to 6.4 points among 20-24 year olds. Since individuals either have a job or do not, the employment to populations ratio is a more reliable measure. Thus, the difference in the reported levels is striking.

Second, rates of unemployment also differ between the surveys, with the NLS showing typically higher rates among the youngest males and generally lower rates among the older males. The unemployment rates for 16-17 year olds diverge by 4.2 to 8.6 points; those for 18-19 year olds by -0.5 to 3.9 points; those for 20-24 year olds by -1.2 to 0.2 points.

Third, the higher employment to population ratios and differing rates of unemployment translate into even larger differences in labor force participation rates (LFPR's) between the surveys although the differences narrow with age. For 16-17 year old males, the NLS LFPR's are 14.3 to 18.3 points above the CPS LFPR's; for 18-19 year old males, the NLS LFPR's are 8.1 to 11.1 points higher; and for 20-24 year old males, the NLS rates dominate by 2.7 to 5.9 points.

Fourth, consistent with the employment to population ratio evidence, the evidence on weeks worked in the previous year also shows divergences, with the CPS indicating that young males work fewer weeks than is indicated by the NLS.

Fifth, although the NLS and CPS report strikingly different patterns of work activity, they report similar proportions of young men in shcool.

And sixth, differences in reported labor force activity tend to be less for older males than for younger.

Racial Differences

Does the pattern of higher rates of work activity in the NLS than in the CPS hold for nonwhite males as well as for all young men? To what extent does the magnitude of white-nonwhite difference in work activity differ between the surveys?

Table 2 contains the basic data needed to answer these questions: rates of activity disaggregated by race. The figures in the table show that the pattern of higher work activity rates in the NLS than in the CPS is found among nonwhite males as well as among white males. More importantly, comparison of the rates of activity of nonwhite and white young men estimated with the two surveys reveals a general pattern of much smaller absolute differences in employment to population ratios between nonwhite and white male youths in the NLS than in the CPS, especially for younger men:

Table 2: Comparison of Rates of School and Labor Force Activity for Young Men by Race, 1966-1971: NLS vs. CPS

	No. in NLS[a] Sample	% in School[b]		Emp/Pop[c]		LFPR[c]		Unemployment[c]	
		NLS	CPS	NLS	CPS	NLS	CPS	NLS	CPS
				WHITE MALES					
16-17 yr. olds									
1966	1310	90.7	90.3	48.4	NA[e]	59.4	NA	18.6	NA
1967	1319	91.7	91.4	45.6	36.7	56.1	42.8	18.7	14.4
18-19 yr. olds									
1966	1093	63.3	59.0	64.1	NA	70.6	NA	9.1	NA
1967	1099	64.3	57.2	62.8	56.7	70.0	63.4	10.3	10.6
1968	1085	60.0	61.5	64.6	55.7	70.2	60.2	7.9	7.5
1969	1103	62.0	60.9	61.2	56.8	69.9	61.4	12.5	7.6
20-24 yr. olds									
1966	1570	32.2	31.6	83.1	NA	85.8	NA	3.1	NA
1967	1496	33.9	32.2	81.8	78.0	84.5	81.2	3.2	4.0
1968	1410	35.4	32.5	79.7	76.5	82.6	79.8	3.4	4.1
1969	1402	32.8	33.6	80.8	76.7	84.6	80.3	4.6	4.5
1970	1619	30.6	30.9	78.2	75.0	84.5	82.2	7.4	8.8
1971	1869	30.0	30.3	80.5	74.1	87.5	81.8	8.0	9.3
				NONWHITE MALES					
16-17 yr. olds									
1966	656	84.9	87.2	43.0	NA	58.2	NA	26.2	NA
1967	657	84.4	88.0	40.6	26.2	57.8	36.7	29.8	28.8
18-19 yr. olds									
1966	426	49.8	49.1	58.5	NA	74.0	NA	20.9	NA
1967	523	54.4	50.5	59.7	47.0	74.0	60.1	19.4	21.7
1968	534	53.3	53.5	61.7	45.6	71.3	57.2	13.5	20.3
1969	518	43.5	49.8	59.0	52.6	70.9	65.1	16.9	19.0
20-24 yr. olds									
1966	486	15.3	12.3	89.9	NA	90.1	NA	3.5	NA
1967	480	16.2	18.9	84.8	76.9	91.9	85.7	7.8	10.3
1968	499	18.5	16.3	84.5	79.0	87.9	84.7	3.7	6.7
1969	568	18.1	20.5	78.1	78.2	85.5	84.7	8.7	7.7
1970	664	18.9	18.1	75.1	69.0	87.9	81.2	14.6	15.0
1971	731	19.1	21.7	75.3	69.5	86.7	79.9	13.2	13.0

Notes: [a,b,c,d] See comparable note in Table 1.
[e] Not available.

Difference in Employment to Population Ratios for Young White Males Versus Young Nonwhite Males from Table 2

(White Minus Nonwhite)

	1967	1968	1969	1970	1971
16-17 year olds					
CPS	10.5	--	--	--	--
NLS	5.0	--	--	--	--
18-19 year olds					
CPS	6.2	10.0	4.2	--	--
NLS	3.1	2.9	2.1	--	--
20-24 year olds					
CPS	1.1	-2.5	-1.4	6.0	4.6
NLS	-3.0	-4.9	2.7	3.1	5.2

If the NLS figures are correct and the CPS figures incorrect, the differences in employment to population ratios for nonwhite young men and for white young men is much smaller than is generally believed. Alternatively, if the CPS figures are correct and the NLS figures incorrect, studies of the causes and effects of nonwhite-white differences in employment using the NLS tapes are questionable.

Inspection of other variables in Table 2 reveals that while the CPS yields white labor force participation rates that are higher in five of nine cases than the comparable nonwhite rates, the NLS gives nonwhite participation rates which are typically above the comparable white rate. White-nonwhite differences in percentages in school are larger in the NLS than in the CPS, while differences in unemployment rates tend to be somewhat smaller in the NLS than in the CPS, at least for younger men, as shown below:

Differences in Unemployment Rates for Young While Males Versus Young Nonwhite Males from Table 2

(Nonwhite Minus White)

	1967	1968	1969	1970	1971
16-17 year olds					
CPS	14.4	--	--	--	--
NLS	11.1	--	--	--	--
18-19 year olds					
CPS	11.1	12.8	11.4	--	--
NLS	9.1	5.6	4.4	--	--
20-24 year olds					
CPS	6.3	2.6	3.2	6.2	3.7
NLS	4.6	0.3	4.1	7.2	5.2

School Status

How do the differences in work activity between the NLS and CPS vary by the school status of the young? Given the differences by age group presented in Table 2, one would expect greater divergences among those whose major activity is reported as being in school than among those whose activity is not being in school. Table 3 presents evidence for the 16-21 year old group of males for whom the Census publishes data on work activity by school status which is consistent with this expectation. The table shows three things.

First, NLS-CPS differences between the employment to population ratios and labor force participation rates for young men are greater for those youth whose major activity is school than for others. Employment to population figures differ by 10.9 to 12.3 points for the in school young men compared to 4.8 to 10.6 points for other young men.

Second, mean weeks worked for 16-21 year old males are higher by 4.1 to 7.1 weeks in the NLS than in the CPS for those sample members whose major activity is school and by about 2.6 to 3.4 weeks for the other sample members

Third, the direction of differences between the unemployment rates calculated from young men with the NLS and those calculated with the CPS depends critically on the major activity of persons. For 16-21 year old males whose major activity is other than being in school, the NLS shows much lower rates of unemployment than the CPS. For those males whose major activity was school, however, the NLS shows much higher rates of unemployment than the CPS.

Table 3: Comparison of Rates of School and Labor Force Activity for Young Men, by Major Activity, 1967, 16-21 Year Olds: NLS vs. CPS

	No. in NLS[a] Sample	Major Activity[b]		Emp/Pop[c]		LFPR[c]		Unemployment[c]		Weeks Worked[d]	
		NLS	CPS	NLS	CPS	NLS	CPS	NLS	CPS	NLS	CPS
TOTAL MALES											
Major activity: school	2284	65.2	64.7	42.8	31.7	52.7	36.5	18.8	13.1	21.5	17.1
Major activity: other	1248	34.8	35.3	87.8	82.1	92.8	91.3	5.3	10.2	37.1	33.7
WHITE MALES											
Major activity: school	1657	66.3	66.1	43.9	33.0	52.9	37.5	17.0	11.9	22.0	17.9
Major activity: other	786	33.7	33.9	88.6	83.8	92.5	91.6	4.2	8.5	38.0	34.6
NONWHITE MALES											
Major activity: school	627	57.5	55.8	33.9	21.6	51.0	28.8	33.7	25.2	17.4	10.3
Major activity: other	462	42.5	44.2	83.7	73.1	94.2	90.1	11.1	18.9	32.4	29.8

Notes: [a,b,c,d] See comparable note in Table 1.

Overall, the greater differences in work activity or desired work activity for those in school suggest that much of the differences between surveys occur among those who are going to school and are thus most likely to have a more marginal commitment to the work force.

CPS vs. NLS72

Table 4 compares the October 1972 rates of work activity for young males indicated by the National Longitudinal Survey of the Class of 1972 with the rates for young men indicated by the CPS study of graduates and dropouts in the class of 1972. The principal finding in the table is that the NLS72, like the NLS, reports higher employment to population ratios among young males not enrolled in school than does the CPS, somewhat smaller differences in employment to population ratios between nonwhite and white young men, and much smaller rates of unemployment for both white and nonwhite male youths. With respect to labor market activity, the figures based on the NLS72 differ from the figures based on the CPS data in the same direction as the NLS-based estimates differ from the CPS-based estimates.

III. What Explains the Difference?

There are three major potential sources of differences in the youth activity rates reported in the CPS and those reported in the longitudinal surveys.

First, the surveys could yield different results because of differences in respondents--the fact that on the longitudinal surveys youths report their

Table 4: Comparison of School and Labor Force Activity for Young Men, by Race, October 1972: NLS 72 vs. CPS Survey of the High School Class of 1972

	White Youth		Nonwhite Youth	
	NLS72[a]	CPS[b]	NLS72[a]	CPS[b]
1. Percent enrolled in school[c]	57.6	52.8[d]	46.7	52.5[d]
2. Percent not enrolled	42.4	47.2	53.3	47.5
3. Percent employed of not enrolled	88.0	81.5	78.4	68.0
4. Percent in labor force of not enrolled	92.9	91.6	90.2	88.0
5. Percent unemployed of not enrolled youth	5.3	11.0	13.0	22.7

Notes:

[a] Meyer and Wise, "High School Preparation and Early Labor Force Participation," Table 1: 'Percent Male Youths in School and Work Categories, and Labor Force Statistics, by Year and Race, October of Each Year.'

[b] U.S. Department of Labor, Bureau of Labor Statistics, Employment of High School Graduates and Dropouts: October 1972, Special Labor Force Report 155. Table 1: 'College Enrollment and Labor Force Status of 1972 High School Graduates, October 1972,' p. 27.

[c] Full and part time students.

[d] Enrolled in college.

own activity, whereas in the CPS, proxy respondents report what youths do. Young men report themselves doing relatively more work than proxies report them doing. They may tend to exaggerate their work time or they may actually hold jobs unknown to other household members. Whatever the cause, at least some of the CPS-NLS and CPS-NLS72 differences could reflect "respondent bias."

Second, the surveys could yield different results because of the differences in the population covered. The longitudinal surveys may be subject to selectivity bias due to the unwillingness of some young men to participate, particularly as time proceeds. If the male youths who do not participate have a lower probability of being employed than those who do, the longitudinal surveys would yield higher employment to population ratios than the CPS.

Third, the differences in work activity estimates across surveys could also be due to differences in the way in which the surveys are conducted. For instance, differences in the extent of reliance on telephone versus in-person interviews or differences in the number of times that an individual is interviewed in a given year could affect the responses yielded by the various surveys.

This section attempts to ascertain the relative importance of each of these three potentially relevant factors. The main finding is that a very substantial portion of the CPS-NLS differences in the estimated probability that a teenage male is employed seems to be explicable by the fact that the CPS relies primarily on proxy responses while the NLS does not.

Respondent Bias

The most direct way of evaluating the extent to which "proxy-respondent bias" contributes to the CPS and longitudinal survey differences in rates of school and labor force activity among young males is to compare the self-reported labor force activity of young men with the activity reported for them by other household members. If some of the differences in results with the CPS and longitudinal surveys are due to respondent bias, then we would expect to find males giving self-responses which indicate more employment than do the proxy-responses that are given by their parents. The information needed for this type of experiment was collected in the NLS; to save on sampling cost, the survey queried more than one member of a substantial number of families. In particular, both mothers and sons were asked about the work activity and enrollment of the sons. Thus, with these data it was possible to develop a matched sample for comparing the activity reported by a young man with the activity ascribed to the youngster by his mother, the most likely proxy-respondent. We used the family record numbers on the tapes to create a matched file of this nature; it contains information on 1,541 mother-son pairs in 1966, 1,094 pairs in 1968, and 734 pairs in 1970. While the mothers were not asked the labor force status of their sons at a moment in time, they were asked:

> In all how many weeks did . . . work either full or part time (not counting work around the house)?

which is comparable to the weeks worked question on the young men's survey.

Weeks Worked Comparisons

A comparison with NLS data of the weeks worked by a group of young men as reported by their mothers and by themselves must be done carefully because of modest differences in the time period to which the relevant questions relate. As indicated below, mature women were asked about the activity of their sons over a calendar year while their sons were asked about their own activity over a slightly different period, covering the 12 months prior to the survey.

Respondents	Approximate month of year interviewed	Weeks worked of young men relates to
mature women	May, 1967	1966 (Jan. '66-Dec. '66)
young men	Nov., 1966	past 12 months (approximately Dec. '65 - Nov. '66)
mature women	May, 1969	1968 (Jan. '68-Dec. '68)
young men	Nov., 1969	past 12 months (approximately Dec. '68 - Nov. '69)

If, as seems reasonable, youth work activity increases over time, the one-month difference in period covered should, if anything, lead to higher rates of activity reported by mothers than by sons, as the mothers' reference period is one month or more later in time than the sons'. Since this potential problem operates to reduce the estimated impact of respondent bias, we ignore it in the ensuing analysis.[9]

Table 5 presents the basic results of the comparison of self-reported and mother-reported weeks worked of young men on the matched file. Only those observations for which data were available from both mother and son were used Line 1 records the number of sons in the sample. The second line gives the distribution of weeks worked reported by mothers and sons, including a "missing" category. The mean weeks worked for all responses and for mother-son pairs with no missing values is given in line 3.

What stands out in the table is the markedly lower rates of work activity among young men indicated by the mother proxy-responses than by the son self-responses; the differences in mean weeks worked vary from 4.2 to 6.5 weeks depending on the year and age group (or from 14 to 27 percent of the mean of sons self-reported weeks worked). For 16-17 year olds, the figures differ by 5.6 to 6.5 weeks, for 18-19 year olds and 20-24 year olds they differ by 4.2 to 6.4 weeks.

Table 5: Comparison of Weeks Worked Reported by Sons and Mothers: National Longitudinal Survey 1966 and 1968[a]

Age:	16-17		18-19		20-24	
	1966		1966		1966	
Respondent:	Mother	Son	Mother	Son	Mother	Son
1. Sample size(sons)[b]	1250	1250	430	430	152	152
2. Distribution of Weeks Worked						
missing	16.5	0.3	8.2	0.0	11.7	0.0
0	36.3	27.9	14.8	7.0	11.3	4.2
1-13	25.2	27.4	33.6	24.6	28.9	23.9
14-26	8.8	17.9	15.3	23.6	11.7	19.2
27-39	2.2	6.7	6.1	10.2	4.8	11.7
40-47	1.6	3.4	2.2	5.7	4.2	7.7
48-49	0.2	1.7	1.9	3.3	2.0	4.8
50-52	9.2	14.7	17.8	25.6	25.3	28.5
3. Mean Weeks Worked (with observations missing relevant information deleted)	12.1	17.7	21.2	27.6	26.4	30.6

Age:	16-17		18-19		20-24	
	1968		1968		1968	
Respondent:	Mother	Son	Mother	Son	Mother	Son
1. Sample Size(sons)[b]	603	603	619	619	282	282
2. Distribution of Weeks Worked						
missing	3.4	3.0	3.1	7.0	5.3	11.8
0	30.5	13.4	15.6	8.4	14.2	5.4
1-13	28.2	29.1	30.9	23.0	20.4	14.7
14-26	14.4	16.5	15.1	16.1	17.6	15.6
27-39	3.7	7.6	9.3	8.1	5.9	9.0
40-47	2.3	7.5	3.5	8.0	4.1	9.1
48-49	0.3	3.3	1.3	4.8	2.3	3.8
50-52	17.2	19.6	21.2	24.6	30.3	30.6
3. Mean Weeks Worked (with observations missing relevant information deleted)	17.5	24.0	22.9	28.4	27.4	33.1

Notes:

[a] The NLS estimates presented in this table are weighted averages. The weighting scheme which makes the NLS figures more comparable to those from the CPS, is described on pp. 8 and 10

[b] The sample sizes given are before weighting for age. For example, the sample of sixteen to seventeen year olds includes all those males aged fifteen to seventeen in April of the given year.

To what extent can the differences in weeks worked between mothers and sons explain the differences in weeks worked between the NLS and CPS? The following table presents the data from tables 4 and 5 designed to answer this question:

Comparison of Differences in Mean Weeks Worked as Reported by the NLS and the CPS and by the NLS Mother-Son Matched File

	(1) Difference in Mean Weeks Worked (NLS-CPS)	(2) Difference in Mean Weeks Worked (Sons-Mothers)
16-17 year olds		
1966	4.1	5.6
18-19 year olds		
1966	4.8	6.4
1968	4.8	5.5
average	4.8	6.0
20-24 year olds		
1966	1.1	4.2
1968	4.4	5.7
average	2.8	5.0

According to these calculations, the difference in mother-son reporting could easily explain the divergence between weeks worked reported in the NLS and in the CPS and indeed tends to "overexplain" the differences. The anomolous over-explanation could be rationalized by the fact that the mother-son differences in Table 5 relate only to those males living at home, while the CPS-NLS differences in Table 1 relate to all males. By the respondent bias hypothesis, differences between the CPS and NLS arise when a proxy reports a young male's status on the CPS and the individual reports his status on the NLS. For males not living in their parents' home, we would expect smaller differences in rates of activity between the surveys than are found for young men living at home. One would expect that overexplanation would be more prevalent for older males in the sample since they are less likely to live at home. Indeed, our results show that for 20-24 year old males, roughly half of whom reside outside their parents' home, the overexplanation is substantially larger than for the younger males.

This argument suggests that we tabulate weeks worked for 20-24 year old males who are unmarried heads of households and for those who are not heads of households and use the resultant figures to reestimate the effect of respondent bias on the CPS-NLS difference. The former group will presumably give self-responses in both the CPS and NLS. The latter group will tend to have the mother as proxy-respondent for the CPS. In the tabulation below NLS observations have been weighted (using the weighting procedure described on pages 8 and 10), so that NLS interviewee ages are comparable to those in the CPS. However, the Census weeks worked figures relate to the preceding calendar year (January 1968-December 1968) while the NLS figures relate to the twelve months prior to interview (approximately December 1967-November 1968). Thus, there is one month dif-difference in the time span to which the question pertains. Resolution of this probler has been ignored in tabulation below:

	Mean Weeks Worked from Dec. 67 - Nov. 68; 1968 NLS 20-24 year old males	Mean Weeks Worked in 1968; March 1969 CPS 20-24 year old males	Difference in mean Weeks Worked
Unmarried Heads	41.1	37.3	3.8
Not Heads	33.9	28.8	5.1

As expected, the difference for unmarried heads is much smaller than that for young men who are not heads.

Matrix of Responses

Analysis of the differences in responses between mothers and sons is pursued further in Table 6, which cross-classifies the weeks worked by the son as reported by the mother with the son's weeks worked as reported by the son. Each element in the matrix gives the percentage of mother-son pairs reporting a given pair of weeks-worked values. If there were perfect agreement between mothers and sons, all of the elements of the matrix would fall along the main diagonal and would equal 100. (If there were no relation between the weeks worked reported by mothers and sons, all columns would be identical.) While there is a definite concentration at or near the diagonals, a very large proportion of the sample lie off the diagonal: only 63 percent of mothers whose sons self-report working 0 weeks last year also report their sons as working 0 weeks; only 41.5 percent of mothers whose sons report themselves as working 52 weeks report their sons in that category, and so forth.

The divergences provide evidence of potentially large response bias and measurement error in the weeks worked data, which supports the respondent bias hypothesis. In addition, they suggest the value of a detailed analysis of why some mother-son pairs are in agreement and others are not, a question which we address to some extent in this section.

Employment Activity of Heads vs. Others

If respondent bias is the major cause of the differences in the labor force activity rates of young males implied by the NLS and CPS, one would expect only negligible survey differences for young males who are themselves unmarried heads of households. The activity of these persons in the CPS is more likely to be reported by the individual himself than by others, making the results from the CPS more likely to be consistent with those from the NLS.

To test this implication of the respondent bias hypothesis, the rates of labor force activity of 20-24 year old males who are unmarried heads of households and those who are not heads of households were tabulated for 1969 with the NLS and CPS tapes. The results of the calculations, shown in Table 7, yield a striking conclusion: for 20-24

Table 6: Comparison of Weeks Worked Reported

by Mothers and their Sons; 1966 NLS Data for Males Aged 16-24[a]

Percent of Sons Reporting Weeks Worked		Percent of Mothers Reporting Weeks Worked								
Weeks Worked	Number of Sons Reporting	0	1-13	14-26	27-39	40-47	48-49	50-52	Missing	Total
0	327	63.0	11.0	2.8	.3	.3	.3	.9	21.4	100.0
1-13	405	30.4	40.5	8.4	1.0	--	--	3.5	16.3	100.0
14-26	295	16.3	38.3	17.3	5.4	2.4	.3	7.5	12.5	100.0
27-39	121	19.0	28.1	17.4	8.3	3.3	--	12.4	11.6	100.0
40-47	67	14.9	28.4	14.9	7.5	9.0	1.5	13.4	10.4	100.0
48-49	36	2.3	13.9	13.9	5.6	5.6	8.3	41.7	8.3	100.0
50-52	287	13.2	16.4	11.5	4.2	3.5	2.1	41.5	7.7	100.0
Total	1541	29.2	27.3	10.6	3.2	1.9	.8	12.8	14.2	100.0
Missing	3	33.3	66.7	--	--	--	--	--	--	100.0

Note:
[a] As of April 1, 1966.

year old unmarried heads of households there are no effective differences in the ratio of employment to population or in the rate of labor force participation, whereas for comparable individuals who are not heads there are sizeable differences. It appears that the bulk of the differentials reported earlier is attributable to those whose status is self-reported in the NLS but likely to be reported by the mother in the CPS.

In sum, there appears to be considerable support in the data for the hypothesis that much of the NLS-CPS difference shown in section I is attributable to respondent bias.

Differences in Samples and Methods

Since detailed information on persons designated to be included in the NLS or in the CPS who were not represented is missing, it is difficult to assess accurately the importance of sample differences in explaining the observed differences in the employment experience of young men. However, an examination of the NLS and CPS sampling procedures and the characteristics of their samples yields some insights into the possible magnitude of sample survey bias.

We examine first the sampling procedures. One major difference between the CPS and NLS methods is that the former uses a one stage screening procedure to obtain households for surveying, whereas the latter used a two stage procedure. During the first stage of the NLS process, each of the four NLS samples (young men aged 14-24, young women aged 14-24, women aged 30-44, and men aged 45-59) was designated to represent the civilian noninstitutional population of the

Table 7: Comparison of Labor Force Rates by Household Status of Men Aged 20-24[a]

	National Longitudinal Survey Fall 1968	Current Population Survey March 1969	Difference between NLS Fall 68 and CPS March 69
Unmarried Heads			
Employment/Population	82.7	83.0	-0.3
Labor Force Participation	83.9	84.9	-1.0
Unemployment (UNE)	3.2	4.3	-1.1
Out of Labor Force Major Activity is Being in School	9.7	9.3	0.4
Not Heads			
Employment/Population	66.1	61.0	5.1
Labor Force Participation	68.3	63.0	5.3
Unemployment	4.7	5.5	-0.8
Out of Labor Force Major Activity is Being in School	22.1	26.2	-4.1

Note:

a. Although the NLS observations were weighted in accordance with age to facilitate comparability between the CPS and the NLS estimates (see pages 8 and 10), there is still a difference between the two sets of figures. Both sets of data refer to the survey week The NLS, however, takes place in November while the CPS is administered in March. Thus, there is approximately a four month difference in the period referred to by the NLS and the CPS under analysis. The figures in the table were based on weighted counts with the CPS March 1969 microdata and NLS microdata.

United States. An initial group of 42,000 households from the primary sampling units of the Census was selected by the NLS; a sample of this size was drawn so that no age-sex-color group would be underrepresented. The 42,000 households were screened by interviews conducted in March and April of 1966, and adequate numbers of each age-sex-color group were identified for each of the four NLS samples.

In the fall of 1966, however, a second stage of screening was undertaken to insure that during the months since April the sample size for young men had not become inadequate due to the mobility of male youths. From these two screenings, 5,713 young men were designated to be interviewed; of these 5,225 were actually interviewed, giving a non-interview rate of 8.6 percent.[10] By contrast the non-interview rate on the CPS is considerably lower, ranging from 4.1 to 4.4 percent annually in the 1974-1976 period.[11]

If the employment to population ratio for noninterviewees (those designated to be interviewed who were not) in the NLS is less than for interviewees,[12] and if the employment to population ratio for young males in noninterviewee CPS families is less than for young men in the interviewee families by the same amount, the differential noninterviewee rates in the NLS and the CPS that were observed would cause the estimated NLS employment to population ratio to be higher than the estimated CPS ratio; this would explain part of the difference in employment to population ratios between the NLS and CPS. If, because the CPS is based on proxy as opposed to self responses, the employment to population ratio for young males in noninterviewee CPS families is closer to the rate in interviewee families than the NLS noninterviewee rate is to the NLS interviewee rate, then the higher NLS noninterviewee rate might account for an even larger proportion of the

NLS-CPS young male employment to population ratio differential. In the absence of information on the employment of noninterviewees, only the crudest estimates of the magnitude of the effects can be made.

The calculations that can be made do, however, indicate that noninterviewee bias most likely cannot explain a major fraction of the observed differences in the NLS and CPS employment to population ratios for young men. Under the totally unrealistic assumption that absolutely none of the NLS noninterviewees worked and the assumption that young men in noninterviewee CPS families have the same employment to population ratio as do those in interviewee CPS families, there are still substantial differences in the NLS and CPS young male employment to population ratios to be explained: a 7.1 percentage point differential for 16-17 year olds in 1966 and a 3.8 percentage point differential for 18-19 year olds in the same year. Under the seemingly more realistic assumption that the NLS noninterviewees worked only half as much as the NLS interviewees, the comparable differentials are 9.1 and 6.6 percentage points. Thus noninterviewee bias could only account for a part of the 11.2 and 9.3 percentage point differentials for 16-17 and 18-19 year old males in 1966 shown in table 1.

In the NLS72, 21,350 of 23,451 students responded to the first follow-up survey, giving a noninterview rate of 9.0 percent, which is comparable to the NLS rate.[13] As argued above in discussing sample bias with the NLS, this noninterview rate could also explain some, but certainly not all of the differences between the surveys.

An alternative method for assessing important sample differences is to compare the non-work characteristics of the samples. The NLS two-stage screening process described above was specifically designed to compensate for the high mobility of young men. It seems that young men who passed through this double screen would be more stable than those selected through a single screening process (such as that found in the CPS). If the NLS sample does have a larger fraction of young persons with stable characteristics, then we would expect some of the estimated differences in employment to population ratios to be attributable to characteristics of the sample respondents.

Information on the household status of individuals in the NLS and CPS suggests that the surveys' samples include similar fractions of high-propensity-to-work individuals. In the CPS 46 percent of 20-24 year old men are heads of households; in the NLS 48 percent of the comparable group are heads, a negligible 2 percentage point difference. If the CPS heads-others difference in employment to population ratios given in Table 7 is assumed valid, the 2 percentage point difference in the relative importance of heads and others implies a .57 (=28.3 x .02) point NLS-CPS differential in the overall ratios. If the NLS heads-others difference in employment to population ratios given in Table 7 is used, the 2 percentage point difference translates into a .47 (=23.6 x .02) point differential. By contrast, the difference in the employment to population ratio for others in the table predicts about a 3.0 point differential no matter which estimate of the ratio of others to others plus heads is used. Thus, sample differences appear to account for a relatively tiny fraction of the NLS-CPS difference in employment to population ratios.

There are two other potentially important differences in the way the NLS and CPS surveys are carried out. These involve the rotation pattern and the method of interview.

Under the CPS, a respondent will appear in a survey for four months, be dropped for eight months, interviewed for another four months, and then be dropped permanently. During any month, one-eighth of the sample will be interviewed for the first time, one-eighth for the second time, and so on. Under the NLS, the same young male sample group is interviewed once each year for the duration of the survey.

The other difference concerns interview technique. The CPS primarily uses telephone interviews to collect its data. The NLS data on young persons (for the time periods discussed in this study) were gathered using face to face interviews nearly exclusively.

It is likely that these two differences in survey methods will lead to a difference in the employment to population ratios observed between the NLS and CPS. This contention is supported by analyses of the National Crime Survey (NCS) currently being conducted by R. Lerman and H. Woltman.[14]

The NCS surveys 14,000 households each month. A total of 72,000 households are selected for interview over a three year period. They are interviewed one month, left out of the sample for five months, interviewed again, left out for another five months, and so on for the three year period.

There are two other important characteristics of the NCS. First, more than 90 percent of the survey responses are self-reported, which makes the NCS similar to the NLS and NLS72. Second, about 80 percent of the NCS interviews are personal interviews, in contrast to the CPS in which the majority of interviews are done by telephone. Therefore, the most important differences between the NCS and CPS are that the NCS is self-response as opposed to proxy-response, is based primarily on personal rather than telephone interviews, and uses a a rotation pattern under which sample members are never surveyed two months in a row. In all these respects, the NCS methodology is similar to the NLS methodology.

In analyzing the NCS data, Lerman looks separately at young persons broken down by age, race, and sex. His age groups are 16-17 year olds, 18-19 year olds, 20-21 year olds, and 22-24 year olds. Lerman's tabulations reveal that the employment to population ratios among young males (especially nonwhites) based on the NCS are significantly higher than those derived with the CPS. However, the Lerman employment to population rates for young females show substantially smaller differences than those observed for males. In fact, for Lerman's largest group of females (white females aged 22-24), the CPS employment to population ratio is higher than it is with the NCS. These findings suggest somewhat different patterns of response bias for women than for men.

Woltman examined samples of people who were coming into the NCS or CPS for the first time. He limited his sample to in-coming survey members in an effort to control for potential differences in rates caused by differences in the surveys' rotations and in the extent to which the surveys rely upon telephone and personal interviews. This could be accomplished since in both surveys the first interview conducted with a sample member is done in person.

Woltman did his calculations for two age groups (16-19 year olds and 20-24 year olds) but did not cross-classify individuals by age and either race or sex. He found virtually identical employment to population ratios for each age group for new members of the NCS and new members of the CPS. Part of Woltman's result can be explained by the fact that he, unlike Lerman and us, did not focus just on young males, since, according to Lerman's analyses, there appear to be much smaller and even differently signed differentials for young females. Nevertheless, it is unlikely that this fact can fully explain the Woltman findings. This leads us to believe that the nature of a survey's rotation pattern and its reliance on personal versus telephone interviews affects the estimates that it obtains of the employment to population ratios for young males. The numbers derived by Lerman and Woltman do not appear to refute our belief that the key factor causing differences in the employment to population ratios among young males estimates with various surveys is whether or not the surveys relied on self-responses as opposed to proxy-responses. They do, however, underscore the need for more data collection and analysis concerning the issue at hand.

IV. Future Research

The finding that much of the cross-survey differences in reported male youth work activity depends on the way in which these surveys are conducted raises many important questions. What factors explain the differences in the responses that young males give concerning their work activity and the responses that proxies give about the work activity of these youths? What additional research is needed to confirm or disconfirm the respondent bias hypothesis? How can we discover whether young persons or their parents are providing more accurate information on actual activity? What should be done to improve our data base?

Why responses differ

There are two basic reasons for expecting differences between self-reported work activity and proxy-reported work activity: first, differences in knowledge of the facts; second, differences in the accuracy of reporting a given set of facts, possibly for reasons of self-esteem.

The NLS matched mother-son file can be used to analyze the factors which affect the mother's report of son's weeks worked. To do this, we ran regressions of the son's weeks worked as reported by his mother in 1966 on the seemingly relevent and available characteristics of the son, his mother, and their household. The estimated coefficients for 1966 of the most complete equation fit and the mean and standard deviation of each of the model's variables are given in Table 8. These figures indicate several interesting results.

Table 8: Factors Affecting Number of Weeks Worked for Son as Reported by Mother, 1966 NLS Data for Males Aged 16-24[a] (N = 474)

	Dependent Variable: Son's weeks worked in 1966 reported by mother[b]	
Independent Variables:	Mean (S.D.)	Coefficient[c] (Standard error)
Reported by Son		
son's weeks worked	25.10 (18.73)	.576 (.040)
son's enrollment status (in school = 1)	.723 (.448)	-2.634 (1.754)
son's usual hours worked per week	28.52 (17.49)	.076 (.043)
son's hourly wage in current or last job	1.370 (.853)	-.541 (.946)
son's age[a]	17.41 (1.680)	.207 (.461)
son's race (nonwhite = 1)	.418 (.494)	-2.827 (1.587)
Reported by Mother		
mother's weeks workd	24.22 (23.33)	.008 (.052)
mother's usual hours worked per week	22.16 (19.79)	.031 (.060)
mother's education	10.12 (2.737)	.096 (.285)
number in household	5.97 (2.517)	-.367 (.300)
1966 family income (in thousands of dollars)	8.659 (6.008)	.000 (.000)
R^2		.393

[a] As of April 1, 1966.

[b] The mean (S.D.) of the dependent variable is 19.61 (18.75).

[c] A constant was included in the regression estimated.

First, the coefficient relating the young males' weeks worked reported by mothers to the weeks worked reported by sons is markedly less than 1. While increases in sons' reported weeks worked raise mothers' reported weeks worked, the effect is just .6 weeks for every 1 week increase reported by sons. Thus, the absolute difference in weeks worked grows with weeks worked.

Second, the race of the family affects the number of weeks worked the mother reports for her son. The mother tends to report a much smaller number of weeks worked for the son if the family is nonwhite. The minus 2.8 weeks effect of race is a 15% difference in weeks worked at the mean of the sample.

Third, son's enrollment status has a large negative (though insignificant) effect on his mother's proxy-response: if the son is enrolled in school the mother's reported response will be much smaller than if he is not enrolled.

Fourth, the mean of the son's reported usual weekly hours worked is large (28.5), indicating that our typical young male labor force member with a job is working more than just a couple of hours a day; the estimated coeffi= cient of this variable is positive (but insignficant).

In contrast, family income has no partial relationship to the number of weeks worked reported by a mother for her son. Neither do a mother's educational background, her current labor market status, and the size of her household seem to be partially related to her proxy-response.

Overall, the principal finding is that the divergence between self- and proxy-responses appears to be larger for youths whose attachment to the labor force is weaker while, except for race, the demographic characteristics of individuals does not greatly affect the divergence.

Improving the data base

The cross-survey differences in rates of young male work activity reported in this study suggest that the magnitude, let alone nature, of youth joblessness is known with less certainty than is currently believed. If the estimates from relevant surveys other than the CPS are correct, more young males hold jobs than is reported in government statistics, and some aspects of the youth joblessness problem are exaggerated. If the CPS data are correct, analyses of youth joblessness based on the longitudinal surveys could be seriously flawed. Because valid scientific analysis and policy prescription require data which accurately deal with the issue at hand, improving our information about what youth in our society are actually doing should be a top priority for those concerned with the youth unemployment problem. In this section we offer some suggestions about ways in which improvements might be made.

First, it is important to obtain better estimates of the extent to which respondent bias affects estimates of the work activity of the young. While useful, our analyses of the matched mother-son NLS sample suffer from various problems, as described earlier, and should be corroborated (or disproved) with actual CPS-derived data. We recommend that the Bureau of the Census survey youths whose families are included in the CPS and compare the youths' self-reported work activity to that reported by proxy respondents. If such a study substantiates our findings, it will be necessary to devise new methods of obtaining information about youth work activities, either through new questions designed to elicit more accurate information about the employment of the young, or through CPS supplements answered by the young (and other relevant individuals) themselves. Whatever approach is taken, the Bureau of the Census should undertake a major analysis of the responsent bias problem as it relates to youth.

Second, a substantial effort should be devoted to determining whether self-reported or proxy-reported youth work activity rates are more accurate. This can be done by requesting information on the putative employer of the youth and verifying the reported job with the employer. Such an analysis would go far beyond what we have been able to do in this study and significantly improve our knowledge of basic labor force activity. Thus, we recommend that the Bureau of the Census request names of employers from young persons, particularly those reporting employment when a proxy-respondent does not report the youth with a job and attempt to verify the position of the youth.

Third, we believe that serious attention should be given to the development of entirely new questions and concepts for analysis of the activity of youth (and others who are not typically heads of households). The current set of CPS questions were developed in large measure to determine the employment status of adult heads of households and are not well-suited toward understanding the economic problems of youth. Current CPS questions provide very little information on the activities of jobless persons who are cut of school, essentially defining their status negatively: they are not employed and not in school. What is needed is a set of questions evaluating what these people do with their time, possibly oriented in part toward whether their current activity is likely to increase or decrease their chances for employment in ensuing periods. We recommend that the Bureau of the Census experiment with new sets of questions to find out what persons are doing who are out of school and not employed. Such questions should seek to determine the way in which time is allocated by the young (and others in this state) between unpaid work in the home, part-time school, "loafing," and so forth. It is difficult to understand the problems faced by the not-employed, not-enrolled young person when we have so little information about what they are doing. What is needed, we wish to stress, is not additional questions designed to differentiate discouraged from other young workers on the basis of possible work plans, but rather objective information on what people actually do when they are not employed and not in school.

Basically, we believe that to adequately deal with new economic problems like youth joblessness we need new data. The payoff from obtaining more information about what teenagers are really doing and why they are really doing it will most likely be extremely high.

Footnotes

[1] The divergence between youth labor market conditions as depicted in the NLS and the CPS was noted in the important study by Borus, Mott and Nestel. An earlier but much less complete discussion of the phenomenon is found in Parnes.

[2] For an in-depth discussion of the CPS see Hanson.

[3] This information was gathered in a telephone conversation with Paul Flaim of the Bureau of Labor Statistics.

[4] U.S. Bureau of Labor Statistics, BLS Handbook of Methods, Bulletin 1910.

[5] For an in-depth discussion of the NLS see Ohio State University.

[6] Another difference, pointed out by Borus et al., exists between the 1966 CPS and NLS. The NLS adopted changes in the definitions of employment and unemployment in 1966 which were not adopted by the CPS until 1967.

[7] For a discussion of the NLS72 survey see U.S. Department of Health, Education and Welfare.

[8] This information was gathered in a telephone conversation with Gilbert Nestel of Ohio State University.

[9] Another possible source of discrepancy exists because mothers are interviewed about their son's activity from four to six months after the end of the reference period. Sons, however, are interviewed immediately after the reference period. The direction of the bias introduced by this discrepancy is unclear.

[10] These data were calculated with NLS tapes.

[11] See Hanson, p. 23. for a discussion.

[12] See Borus et al., p. 18 for more information.

[13] These figures were derived from data in Levinsohn et al.

[14] This discussion is based on telephone conversations with Robert Lerman and Henry Woltman and on a memorandum by Woltman.

Bibliography

Borus, Michael E., Frank L. Mott, and Gilbert Nestel. "Counting Youth: A Comparison of Youth Labor Force Statistics in the Current Population Survey and the National Longitudinal Surveys." Conference Report on Youth Unemployment: Its Measurement and Meaning. U.S. Department of Labor; Office of the Assistant Secretary for Policy, Evaluation and Research; and the Employment and Training Administration, 1978, pp. 15-34.

Hanson, Robert H. The Current Population Survey: Design and Methodology. U.S. Department of the Census. Technical Paper #40. Washington, D.C., 1978.

Levinsohn, Jay R. et al. National Longitudinal Study Base Year, First Second and Third Followup Data File Users Manual, Washington, D.C., National Center for Education Statistics, April, 1978.

Meyer, Robert H. and David A. Wise. "High School Preparation and Early Labor Force Experience," pp.

Ohio State University, College of Administrative Science, Center for Human Resources Research. The National Longitudinal Surveys Handbook. November, 1977.

Parnes, Herbert S., et al. Career Thresholds. Manpower Reserach Monograph Vol. I, No. 16, Appendix E. Washington, D.C.: GPO, 1970.

U.S. Bureau of the Census. Current Population Reports. Series P-20. "School Enrollment," October 1966-October 1971. Washington, D.C.: GPO, 1967-1972.

U.S. Bureau of the Census. "National Longitudinal Surveys, Survey of Work Experience of Males 14-24." Forms LGT-201, 211, 221, 231, 241, 251. Washington, D.C.: GPO. 1966-1971.

U.S. Bureau of Labor Statistics. BLS Handbook of Methods, Bulletin 1910. Washington, D.C. U.S. GPO, 1976.

U.S. Bureau of Labor Statistics. Employment and Earnings. December 1966-1971. Washington, D.C.: GPO, 1966-1971.

U.S. Bureau of Labor Statistics. Employment of High School Graduates and Dropouts: October 1972. Special Labor Force Report 155. Washington D.C.: GPO, 1972.

U.S. Bureau of Labor Statistics. Work Experience of the Population. Special Labor Force Reports 91, 107, 115, 127, 141, 162. Washington, D.C.: GPO, 1966-1971.

U.S. Department of Health, Education, and Welfare, Office of Education. National Longitudinal Study of the High School Class of 1972. Final Report, Washington, D.C.: GPO, June 1973.

Woltman, Henry. "Memorandum for Tom Walsh, Comparison of Youth Employment Estimates from the CPS and the NCS." Washington, D.C.: U.S. Bureau of the Census, Statistical Methods Division. March 30, 1979.

Time Series Changes in Youth Joblessness

Michael L. Wachter
Choongsoo Kim

Introduction

Youth unemployment has increased over the past two decades in absolute terms relative to prime-age male unemployment. More recently the unemployment rates for most youth groups have begun to level off and move in parallel with prime-age male unemployment rates. This is especially true for white males.

Explaining these developments in a statistical sense presents major problems. First, the underlying developments appear to be due to economic-demographic swings of intermediate-run duration. Hence, the length of the time series data base is woefully short. Second, many of the most interesting and potentially important explanatory variables, such as government policy variables, have major measurement problems.

Our view stresses the role of "cohort overcrowding" which results from an imbalance between younger and older workers. The model is based on two central assumptions. The first is that younger and older workers are imperfect substitutes for each other. The main difference between them reflects their relative amounts of specific training. Given the "putty-clay" nature of physical and human capital and the transient nature of the cohort bulge, the economy's adjustment process may be slow and incomplete. In the short-run, elasticities of substitution are relatively low so that large relative wage adjustments can occur.

The second is that aspiration levels or desired standards of living are formed when the younger workers are living with their parents. This is an endogenous taste or habit formation model where past living standards influence current desired standards. In addition, young families are assumed to treat their desired standard of living as a necessity. Hence, in the event of lower wage levels, families will increase the number of workers and/or hours worked. The increase in labor force participation rates of the young workers can thus be traced directly to the population demographics. In addition, the induced change in participation rates serves to aggravate the existing oversupply problem of younger workers, further driving down relative wages.

As relative wages fall for the oversized cohort, institutional constraints, such as government transfer programs, minimum wage levels, etc., become relevant and cause an increase in unemployment rates as well as or instead of the increase in participation rates. If the unemployment effects are large enough, employment may actually decline.

Although some previous studies have attempted to isolate the effects of government programs, for example minimum wage legislation and manpower programs, data problems make this task almost impossible. Besides the data problems, there are important conceptual problems as well. The government's social welfare package, whether intentional or not, is an integrated program. The parameters of the various programs tend to change together reflecting common political pressures and the need to complement each other An example is the parallel increase in minimum wage coverage and government transfer payments (in relative terms) during the late 1960's. Since almost all studies concentrate on one government program at a time, they miss these crucial interrelationships and, hence, attribute too much to the single program under study. We also find that "relative wages" have some explanatory power, but cannot separate minimum wage from government transfer effects. In addition, attempts to include direct job creation effects invariably yield the wrong sign.

Our empirical work focuses on two approaches. The first attempts to measure unemployment in different ways by altering the numerator and/or the denominator of the unemployment rate term. For example, we argue that the variable which is closest to the traditional measure of unemployment would give school attendence equal status with employment. Hence, the numerator would exclude those who were unemployed and whose primary activity was school and the denominator would include all of those who were in school. The second approach focuses on disaggregating youth activities into four categories - unemployment, employment, school, and a residual (all as a ratio to the population) for each of the age-sex-race groups. Equations are then estimated using the same explanatory variables and adding the constraint that the four ratios sum to unity.

Since black males pose a particular problem, we concentrate somewhat on the deterioration in the unemployment and employment ratios of this group relative to other youth groups. Why should this group suffer a deterioration in labor market position relative to other youth groups, including black females?

The paper is organized in the following manner: Section I presents the basic model of cohort overcrowding. Section II provides the basic age-sex-race youth unemployment equation. Section III analyzes alternative measures of youth unemployment. Section IV provides the justification and estimates for our four activity equation system. Section V analyzes the puzzle of the deteriorating labor market position of black males, age 16-24.

I. The Basic Model of Cohort Overcrowding

A. The Underlying Workings of the Model

In some earlier work by the authors and others, the youth unemployment problem was explained in the context of a broader economic-demographic model.[1] The basis of the model is a "cohort overcrowding" effect which results from an imbalance between younger and older workers. We shall utilize this approach to explore the developments in youth unemployment over the past fifteen years. It was during this period that the baby boom cohort was passing through the 16-24 age category.

This type of model can generate cyclical swings of intermediate length in unemployment rates. A fertility increase in generation t causes a large cohort of entry level workers in t + 1. In the short-run, elasticities of substitution are relatively low so that large relative wage adjustments occur. This deterioration in the income potential of young people causes a decline in fertility and family formation rates and an increase in the labor force participation rates of secondary workers. The increase in young workers' labor force participation rates can thus be traced directly to the population demographics. In addition, the induced change in participation rates serves to aggravate the existing oversupply problem of younger workers.[2]

As relative wages fall for the oversized cohort, institutional constraints become relevant and cause an increase in unemployment rates as well as or instead of the increase in participation rates.

If the unemployment effects are large enough, employment may actually decline.

The institutional constraints which cause unemployment can exist on both the demand and supply side of the market. For example, since minimum wage levels are informally indexed on average economy wide wages, a decline in the relative wage for youth may cause the market clearing wage to fall below the minimum wage. Youth, of course, form a heterogeneous skill group with a wage distribution rather than a single wage. The decline of the relative wage, in this case, causes an adverse shift in the distribution of wages. That is, the probability of any youth having a skill and associated wage level that falls below the minimum wage is increased by the demographic overcrowding.

On the supply side, a different institutional factor is operating but with a similar potential result. In both neoclassical labor supply literature as well as institutional literature, workers are viewed as having a reservation wage; when market wages are below that reservation wage, individuals choose not to work. The neoclassical theory tends to specify a continuous trade-off between hours of work and wage rates. It is only at the corner of the indifference map that the wage rate is sufficiently low so that individuals will offer zero hours of work. The likelihood of a corner solution is increased by the existence of public assistance and government transfers in general. These programs have high implicit tax rates. Indeed, it is generally acknowledged that the eligible poverty population for these programs face higher implicit marginal tax rates than do the wealthiest individuals. The result of these programs is to considerably flatten the budget constraint.[3]

The likelihood of a corner solution is also determined by the mechanism through which individuals form their reservation wage. Specifically, individuals' attitudes towards an acceptable wage are determined by wages paid elsewhere in the economy. Of particular importance in defining the indifference map, or "taste" for work is the minimum income level dictated by the government social welfare programs and minimum wage laws. These programs signal what constitutes an acceptable minimum wage to the voting public and policymakers. That is, government programs almost certainly influence the shape of the indifference map as they alter the budget constraint. A liberalization of benefits shifts both the indifference map and the budget constraint toward the corner solution of zero work.[4]

It should be noted that the fluctuations in unemployment discussed in this model, are solely related to changes in the equilibrium rate of unemployment. Cyclical unemployment may be positive or negative in the short-run. But the above demographic cycle is an intermediate swing and averages out the peaks and troughs of the short-run business cycle.

B. A Simple Expositional Model[5]

The major factors that we use in our empirical work can be captured in a simple expositional model. The model is oriented towards the specific empirical factors involved in the demographic shift. To start, assume a production function that recognizes two different categories of labor - older workers who have accumulated specific training (L_A) and younger workers who lack such training (L_B). For our purposes we can view L_A as skilled workers and L_B as unskilled workers. In the long run, the production function can be written as:

$$(1) \quad X^s = f^s (L_A{}^s, L_B{}^s, K),$$

where K is the capital stock, X is the level of output, and the superscript s refers to supply. In the short-run, there appear to be significant lags in achieving desired absolute and relative levels of factor inputs. The lags may arise for a number of reasons including adjustment and expectional factors. The literature on investment functions indicates that long lags are especially relevant to the capital input. If the capital stock is "putty-clay," the input coefficients are fixed as part of the capital endowment. These coefficients may vary for different vintages but, to the extent that they are empirically important, they impart a difficulty in substituting against scarce factors in the short run.

For our purposes, aggregate demand can be viewed as being controlled by monetary (M) and fiscal (F) policies, subject to unanticipated changes in demand from the private sector (X_0):

$$(2) \quad X^d = f^d (M,F,X_0).$$

The derived demand for labor is constrained by either the level of the demand for or supply of output X and by relative factor prices. For B workers, the relevant own wage is either the minimum wage (MW) or a market wage, whichever is higher.

The labor supply for both L_A and L_B is a function of the population in each cohort and the factors that determined the labor force participation rates. For A workers, we assume that the participation rate (r_A) is constant in the short run. Abstracting from influences such as school enrollment and fertility, the main forces determining participation for B workers are the market wage rates for these workers (W_B), the government transfer payments for being unemployed (T_g), the effective minimum wage (MW), and some unspecified trend factors that capture changes in life-style. That is,

$$(3) \quad L_A^{s} = L_A^{s}(r_A, POP_A),$$

and

$$(4) \quad L_B^{s'} = L_B^{s'} \ (POP_B, TREND, g \{W_B, T_g, MW\}).$$

The relationship between W_B and T_g determines the cost of being unemployed. The level of governmental transfers depends upon unemployment compensation and public assistance. The supply of labor relevant to the production function, denoted L_B^{s}, is,

$$(5) \quad L_B^{s} = L_B^{s'} - g \ (W_B, T_g, MW).$$

That is, we distinguish between an observed labor supply, $L_B^{s'}$, and an effective labor supply, L_B^{s}, which is available for employment. The discrepancy, measured by the g function, is a type of structural unemployment.[6]

Equations (1) through (5) indicate a number of reasons for unemployment. The most obvious is cyclical unemployment which results from $X^s > X^d$. In addition, unemployment will vary with (a) the distribution of the labor force between A and B workers, (b) the cost of being unemployed and minimum wage effectiveness, and (c) the bottlenecks of either skilled workers or capital. Over the longer run, when coefficients of production are more flexible, bottlenecks gradually lose their importance as a cause of unemployment. On the other hand, traditional wage equations indicate another source of unemployment. As bottlenecks loosen, relative wages must adjust if the surplus of B workers is to be absorbed. The evidence suggests, however, that the adjustment is very imperfect. Minimum wages prevent employers from moving down their demand curve for B workers and/or alter the reservation wage of B workers. In addition, government transfer programs help to maintain a high reservation wage (relative to their market wage) for the unskilled workers. These latter workers are in the labor force, but are not willing or able to work at the market clearing wage.

II. The Reduced Form Unemployment Equation

A. Basic Considerations

Estimating an unemployment function can be done in several ways given the basic building blocks of labor supply and employment functions. For our purposes it is useful to start by estimating a reduced form relative unemployment equation. In section IV below, we shall estimate both unemployment and employment functions. In this case the unemployment equations serve the role of a labor supply equation. This approach is compatible with the theory outlined above and the fact that prime-age male unemployment is an independent variable. Specifically, it highlights our view that youth unemployment is largely structural in nature and dominated by fluctuations on the supply rather than demand side of the market. For reasons associated with government policy and the dynamics of the overcrowding model, supply side shifts do not induce adjustments in labor demand.

A reduced form relative unemployment equation can be obtained from equation (5) with the additional assumption that fluctuations in $L_B^{s'}$ are captured by a cyclical aggregate demand variable. For most of our calculations, we used the prime-age male unemployment rate.[7]

A large number of alternative proxies were attempted for the government policy variables. None were particularly satisfactory because of measurement errors; essentially most of the data were simply not collected. Our various attempts at representing policy impact are described below. No single policy variable provided the best fit among the 18 age-sex-race groups. Rather than use different policy variables in each equation, we adopted a compromise variable that performed as well as the others but could be viewed as representing several effects. The unemployment rate equations for the various age-sex groups are estimated in the general form:

$$(6) \quad U_i = a0 + a_i \{Si\} + a_2 \ln(U_{PM}) + a_3 \ln(RPy) + a_4 \ln(W/MW) + a_5(\ln(AF/POP)) \text{ or TREND}$$

where {Si} is a vector of seasonal dummies, RPy is the proportion of the civilian population age 16 to 24 to the population age 16+, AF/POP is the military/population ratio (added to the male equations), and TREND is a time trend (added to the female equations).

The RPy variable represents the cohort overcrowding referred to above. Several different specifications of the RPy variable were tried, varying the treatment of the military, individuals over 65 years of age and defining youth over the age span of 16 to 34. The results were largely unchanged. Given this inability to differentiate empirically, the choice of the RPy variable was dictated by usage in earlier studies. It is important to note that this cohort variable assumes that young workers are substitutes for each other and define a distinct labor input. Needless to say, any age division of the labor market into two distinct components has -to-be arbitrary. The difference between a 24 and a 25 year old is not large. On the other hand, labor market attachment, employment patterns, unemployment rates, etc. differ considerably for a 20 year old compared with a 30 year old.

Some recent studies have used separate supply or cohort variables (denoted RPy_i) for each of the youth age-sex groups.[8] For example, the black male population age 18-19 as a percentage of the population age 16+ would be used to explain unemployment of that age-sex-race group. Our view is that this is too limiting a view of the degree of substitution across inputs. Labor market behavior over the past two decades shows more similarities than differences across youth age-sex-race groups. Where the RPy_i variable has been successful, it was only capturing the worsening unemployment position of black youth relative to white youth.[9] As shall be discussed below, however, black youths are not doing worse than comparable white groups by all economic yardsticks. Black school enrollment rates and relative wages, for example, show significant relative improvement. This suggests that RPy_i will not provide a consistent answer to the changing white-black differential.

B. The Government Policy Variable

Although a properly specified unemployment equation should contain separate variables to represent transfer payments, direct job creation, and minimum wages, data and conceptual problems make this impossible. After considerable, but largely unsuccessful experimentation with different proxies for the various programs, the actual government variable utilized in the equations is a "compromise variable" of the form W/MW where W is the average hourly earnings of workers 16-24 years of age and MW is the minimum wage.[10]

Measurement problems are complicated by the fact that the social legislation programs including transfers, minimum wages, and direct job creation are not made independently of each other. That is, policy innovations in one program are likely to be reflected in others. Basically, political and social pressures do not become concentrated in one area. Rather, as was clearly the case during the 1960's and 1970's, the forces that can yield changes in one policy area are also likely to cause similar changes in other areas.

Most of the literature dealing with federal welfare initiatives investigates only one program at a time. There are studies on minimum wages, public assistance, direct job creation, etc., but few of these studies attempt to integrate the direct labor market impact of that single study into the overall package of programs. The limited range of individual studies is easily explainable given the data problems for each single study. The problem, however, in evaluating the overall effect of the various government programs on unemployment is that the programs interact. The sum of the impacts of the individual studies does not equal the overall effect of the variety of programs evaluated together.[11]

The data problems are due to the fact that the major change in the minimum wage is the change in coverage in 1967. Until the 1978 law, however, little other meaningful variation in that variable is evident. Many of the increases in coverage did not affect low wage workers and the staggered catch-up increase in the minimum wage created a saw-tooth pattern in the data with, if anything, a slightly declining trend of the MW relative to W. That is, the time series minimum wage variable is largely a spike in 1967. This, of course, is difficult enough to represent using time series data. Suppose, however, as is likely, that firms adjusted with a lag to this sweeping change in coverage. One possibility is an exponential declining distributed lag response. Depending upon the speed of decay, this would move the mean of the response outward in time, probably to 1968 or 1969. Alternatively, firms may have responded very slowly at first. This may have included low levels of compliance or incomplete compliance in the year immediately after 1967. With a compliance lag and an employment response lag conditional on compliance, the distributed lag structure could resemble a parabola with a mean lag into 1970 or beyond.

Given these possible time profiles for W/MW, and the difficulty of isolating the best fit in the various equations, it is possible for W/MW to move in near precision with transfer, supply side variables. Moreover, as mentioned above, this multicollinearity may be a conceptual as well as a data problem. To the extent that individuals form their reservation wages as a function of MW and transfer payments are adjusted to conform to the same underlying inflation and real income changes effects, the MW construct may be a good approximation of the reservation wage. To the extent that the minimum wage helps to determine the reservation wage of low wage workers, the greater the difficulty in differentiating supply and demand effects.[12]

C. Empirical Results for the Reduced Form Unemployment Equation

Given a lack of agreement or data on the control variables, especially government policy variables, to be introduced into the unemployment equation, it is useful to start with the simplest equation. Shown in Table 1, this equation only includes RPy, U_{PM} and the seasonal dummies. As can be seen, the coefficients of RPy are all positive and indicate higher elasticities for females and blacks.

Since the "cohort overcrowding" effect operates like a trend variable for half of the sample period, namely between 1958 and 1972, it is useful to see if RPy is simply picking up a trend effect. Prior to 1958, RPy is either stable or declining and after 1972 it remains largely unchanged. The question is whether youth unemployment, after controlling for U_{PM}, is best approximated by a TREND or a cohort overcrowding variable. Of the 18 age-sex-race groups, the equation with RPy instead of a TREND yields a higher $\bar{R}^2$ in 15 equations. This provides mild support for the RPy variable. Given their collinearity, it is not possible to distinguish between RPy and TREND to the desired extent. Beginning in the late 1970's, however, these two variables diverge sharply. The RPy variable tends to be strongest in female and white male equations and weakest in black male equations. This pattern will appear with consistency regardless of the exact specification

Table 1

Unemployment Equations with Demographic Overcrowding Variable:

1954:1 - 1978:4

	MALE			FEMALE		
Age-race	RPy	U_{PM}	$\bar{R}^2$/DW	RPy	U_{PM}	$\bar{R}^2$/DW
16-17						
Total	1.0424 (14.82)	.3347 (12.37)	.796/1.832	1.1466 (11.77)	.2382 (6.36)	.748/1.908
White	.8592 (11.22)	.3528 (11.98)	.760/1.808	1.0103 (9.34)	.2667 (6.41)	.707/2.078
Black	2.2524 (16.19)	.2879 (5.38)	.728/1.478	2.0174 (13.37)	.1515 (2.61)	.658/1.490
18-19						
Total	.4446 (6.40)	.5576 (20.86)	.843/1.337	1.2097 (14.24)	.2881 (8.82)	.743/1.188
White	.2386 (3.13)	.5862 (19.97)	.836/1.404	1.1605 (11.31)	.3137 (7.95)	.675/1.2[illegible]
Black	1.4952 (10.99)	.4938 (9.43)	.638/1.140	1.2334 (11.90)	.2403 (6.02)	.617/1.589
20-24						
Total	.5090 (6.68)	.8548 (29.16)	.910/.702	1.1347 (19.67)	.5098 (22.97)	.891/1.360
White	.4733 (5.51)	.8629 (26.12)	.893/.728	1.2004 (18.43)	.5158 (20.59)	.874/1.388
Black	.7793 (6.06)	.8352 (16.87)	.760/.879	.9269 (8.77)	.4782 (11.76)	.652/1.101

and/or the sample period of the equation.

These results suggest that secular or intermediate swings in female and white youth unemployment rates do track well with RPy. The implication is that the unemployment rates of youth groups have largely peaked, relative to prime-age male unemployment rates. Needless to say, we would be more comfortable with this conclusion if the data period were longer and included several complete intermediate swing cycles. The unemployment data by race, however, does not predate the 1950's and the unemployment data by age and sex is only available after the late 1940's.

The black male, 16-24 age groups, are the major exceptions to the notion that youth unemployment rates may have peaked. Since their unemployment rates continue to rise, the TREND variable has a larger t statistic than RPy in the black male equations. A major problem is to explain this divergence between black male youth unemployment rates and those of other youth groups.[13]

III. Other Indicators of the Labor Market Status of Youth

Youth unemployment is a more complex phenomenon than is unemployment for other age groups. Essentially, the unemployment rate construct is not attuned to the unique features of the youth labor market. Rather, it is based on the type of frictional and cyclical unemployment which is most relevant to prime-age males and, in general, to workers with a strong labor market attachment.

Youth unemployment, on the other hand, is much more difficult to categorize. The key difference is that prime-age males tend to be in the labor force year-round, full-time (either employed or unemployed), and youths are frequently moving among jobs or into and out of the labor force. Of the 4.24 million males age 18-19, for example, only 2.37 million were in the labor force and not in school in 1978. Of the 4.23 million males age 16-17, only 1.12 million were in the labor force and not in school. Furthermore, since these numbers are annual averages, (and thus include the summer months when many youths are not in school), they overstate the number that is in the labor market and not in school for the remainder of the year.

Essentially there are many options, besides being in the labor market, open to youths that fit into traditional roles. Young people, for example, can be in school, in the military, or at home beginning to raise their own families. In addition, they can combine these different activities; for example, a disproportionate number of youths who are in the labor market are part-time workers. An increasing percentage of these combine being full-time students and part-time workers. Moreover, the choice of activities shifts frequently over the years. Relatively few young people age 16 to 19 work year-round, full-time. One traditional pattern for this group is to work full-time only during the summer months. Yet even for those who are not in school, changes in status between being employed, unemployed and out of the labor force can occur several times over the year.

Of importance for an evaluation of the unemployment issue is that, from society's perspective, working year-round, full-time is not necessarily the most desirable activity for a young person. Particularly for teenagers, attending school may be preferable to working. For some male youths, serving one's military obligation ranks above civilian employment. For young females, staying home and raising a family may be viewed favorable to working.

Given this perspective, the youth unemployment rate has four major problems. First, since many, if not most, youths are not in the labor force at any given point in time, the unemployment rate is a very incomplete measure of that group's economic position and well-being. Second, since youths move frequently between employment, unemployment and various non-labor market activities, and are disproportionately part-time workers when they work, their unemployment incidence should be higher than for other workers who have stronger attachments to their jobs. Third, since having a job is not necessarily the preferred activity and for some youth age groups is likely to be inferior to schooling, changes in the unemployment rate may provide incorrect information as to the nature and extent of changes in the economic conditions in youth labor markets. Fourth, since many youths do not have a firm labor market attachment, the question of whether they are "actively" seeking work (and thus are unemployed by the BLS definition), is often a judgment call and this leads to a considerable measurement error.[14]

Our initial approach is to develop alternative unemployment rate indicators and analyze how they vary over time. These new indicators for 1978 are shown in Table 2. The point is not that one is better than the other, but rather that they each provide a different and useful perspective on the problem. Our U_1 measure simply adds the military to the denominator of the unemployment rate. Including the military in the denominator of U_1 is an obvious additon since that construction is used by the Bureau of Labor Statistics and is referred to as the total (as distinct from civilian) labor force. Our U_2 measure is constructed by adding those in school and those in the military to the denominator of the unemployment rate; that is $U_2 = U/(L+M+S-(S \cap L)$,[15] including individuals in school (but not including these individuals in the labor force since they are already included in L) is controversial, but useful. Schooling can be viewed not only as a type of employment, involving general human capital training, but also as the preferred activity for many of the youth groups. Including schooling and military in the denominator, to

Table 2

Alternative Measures of Unemployment: 1978

	U or BLS Unemployment Rate(a)	U_1 or Unemployment Divided by Labor Force + Military (b)	U_2 or Unemployment Divided by Labor Force + School + Military (c)	U_3 or Unemployment of Nonenrollees Divided by Labor Force + School + Military (d)
Male				
White				
16-17	17.1	16.9	10.1	4.8
18-19	10.9	10.0	8.0	6.1
20-24	7.6	7.1	6.4	5.8
Black				
16-17	40.7	39.9	15.4	7.8
18-19	30.9	26.3	18.5	14.2
20-24	20.1	17.3	15.2	13.6
Female				
White				
16-17	17.1	17.1	9.8	4.8
18-19	12.3	12.3	9.5	7.6
20-24	8.3	8.2	7.5	6.9
Black				
16-17	41.9	41.9	14.8	8.7
18-19	36.8	36.4	23.8	18.4
20-24	21.6	21.3	18.6	16.8

a) Measured as U/L where U is the number of unemployed and L is the civilian labor force.

b) Measured as $U/(L+M)$ where M is the number in the military

c) Measured as $U/(L+M+S-(S \cap L))$ where S is the number in school and $(S \cap L)$ indicates those who are both in school and in the civilian labor force.

d) Measured as $(U-(U \cap S))/(L+M+S-(S \cap L))$.

yield an augumented labor force (ALF), helps to control for shifts among these activities which result in fluctuations in the unemployment rate that may be related to labor demand conditions.

The U_3 construct, also depicted in Table 2, moves further in treating schooling on a par with employment. Workers, specifically those who want to moonlight and work at more than one job, can be both employed at the first job and unemployed while looking for the second job. According to the definition of unemployment, however, such a worker is counted as employed, but not counted as unemployed. The same issue arises when schooling is included. If an individual is in school, should they also be counted as unemployed if they are looking for a job as well? The U_2 measure does count them as unemployed. It is useful, however, to establish a U_3 measure which excludes this group from the unemployment pool. The U_3 variable is defined as $(U-(U \cap S))/(L+M+S-(S \cap L))$.

The justification for this is that individuals whose major activity is school are likely to be part-time workers with a relatively marginal attachment to a job. The fact they they are in school indicates that they will soon be looking for a different kind of job. Moreover, reporting errors for this group are especially large. What constitutes active job search for full-time students who are looking for part-time jobs?

Whether or not one agrees with this argument, U_3 is still an interesting measure of unemployment. Correctly interpreted, it is the non-enrolled unemployed youth as a percentage of the population that is in school, the military, or the labor force. The difference between U and U_3 is even larger than that for U and U_2. First, the unemployment rates are again reduced considerably with the largest reductions affecting the youngest age group. For example, for white youth age 16-17, the U_3 rate is 4.8 percent. If schooling is viewed as a job (an investment in human capital for future productivity), then this age group is nearly fully employed. Furthermore, one can make a good argument that the U_3 definition is closer to the meaning of unemployment for nonyouth than is the BLS unemployment definition.

Essentially, white youth age 16-17 are largely in school. The school enrollment rate for white males age 16-17 as an annual average was 63.7 percent in 1978. But as mentioned above, teenage labor force statistics need to be inspected for the nonsummer period as well along with the annual average. For example, during the first quarter of 1978, the school enrollment rate for white males age 16-17 was 81.4 percent. The U_3 rate in the first quarter of 1978 was 2.6 percent while the rate in the third quarter was 9.0 percent. That is, most of the 16-17 year old white males are in school in the winter and many of these are unemployed during the summer. The U_3 rate for white males age 16-17 during the winter, however, is below the unemployment rate for white prime-age males.

Even for blacks age 16-17, unemployment is largely a summertime phenomenon. For black males age 16-17, U_3 is only 7.8 percent compared with a BLS measured unemployment rate of 40.7 percent. Looking at the first quarter of 1978, instead of the annual data, the U_3 rate falls to 4.0 percent.

An important result of Table 2 is to show that black unemployment for the 18-24 age group remains a problem even after moving from a U_2 to a U_3 construct. Having narrowed the definition so that it only covers the non-enrolled unemployed as a percentage of the school and work forces, it is disturbing that the resulting U_3 measure is still approximately 15 percent for nonwhites. Moreover, the black U_3 rates for the 18-24 age groups are still more than double the white U_3 rates for comparable groups.

The basic equations containing RPy and U_{PM} as independent variables were estimated for the various unemployment constructs. Since the schooling data at the desired level of disaggregation are only available from 1962, the sample period is shortened to 1962:4 through 1978:4. For comparison purposes, the U equations of Table 1 are reestimated for the shorter time period.

The results support the notion that the alternative unemployment rate indicators, and especially U_3, may be a better cyclical indicator of youth unemployment than the BLS unemployment rate measure. For example, in all but one male equation, the coefficient of U_{PM} is higher when U_3 rather than U is the dependent variable. In the female equation, the coefficient of U_{PM} is also larger for U_3 than U for all the younger groups (where the school population is a significant percentage of the total). Only for the female age 20-24 groups are the coefficients insignificantly different from each other.[16]

IV. The Alternative Activity Equations - Employment, Unemployment, School, Residual

A. Background

Analyzing the labor market and general economic status of youth by focusing on unemployment has severe problems. The Bureau of Labor Statistics divides the youth population into four categories on the basis of major activity. The categories are employment, unemployment, schooling, and residual (denoted R). Of these four divisions, the unemployment category is the smallest. Furthermore, the response error for unemployment is considerably larger than for employment and schooling. Especially for youth who may be either in school and looking for a part-time job or out of school for the summer and interested in working, the BLS question that refers to "actively" seeking work is ambiguous. Indeed, for most youth groups and particularly for teenagers, the notion of unemployment and hence labor force is sufficiently flawed and is a weak statistic for policy purposes.

To avoid concentrating solely on unemployment, we suggest a strategy of studying employment, unemployment, schooling, and the residual categories together. This allows for the observation of flows across categories. For example, it is useful to know whether a change in U_{PM} causes a net increase in the schooling (S) or residual (R) categories.[17]

One problem with the alternative activity equation approach is that the residual category, R, includes both some of society's most advantaged and disadvantaged youth.[18] At one extreme, it includes high school dropouts who have a low skill level, such that they cannot find a job, youths from welfare families who would cost their families their eligibility if they accept a job, and youths who are in poor health. On the other hand, it also includes a large number of young females who are beginning to raise their families, teenagers who are taking the summer off, and relatively skilled youths who are pursuing other activities for a short period of time between jobs and/or school.

There is a tendency among some researchers to interpret an increase in E/P as a positive development, especially if it does not parallel a decrease in S/P. The work ethic aside, there is little basis for this view. Although it would be an easier problem if R only included problem nonworkers, our inspection of the data suggests that this is not the case.

In the equations, we disaggregate the age-sex-race youth population into four mutually exclusive categories. The categories are U/P, (E+M)/P, $(S-(S\cap L))/P$ and R/P. These dependent variables were regressed with the same set of independent variables, as indicated in equation (6), with the exceptions that the percentage in the military were included in the male equations and a time trend was included in the female equations.

By construction, the sum of the four dependent variables should be equal to one. The problem when estimating these dependent variables by single equation techniques is that the linear restriction across equations may not be satisfied. In order to estimate the coefficients of the explanatory variables for these

Table 3

Implicit Coefficients Derived From Constrained Equations

Table 3A
Implicit Coefficients of RPy: 1978:3

Age-Race	MALE				FEMALE			
	S-(S∩L)/P P1	U/P P2	E/P P3	R/P P4	S-(S∩L)/P P1	U/P P2	E/P P3	R/P P4
16-17								
Total	-.5909	.8093	.2441	-.3843	.8157	.0371	-.0525	-.44
White	-.9068	1.0256	.4418	-.7449	.7697	.2165	-.0864	-.38
Black	1.0749	-.3633	-1.5747	.7839	1.6187	-.6933	-.3870	-.75
18-19								
Total	.3485	.3224	-.4480	2.5670	1.7067	.3337	-.5336	.44
White	.1132	.4435	-.3748	2.5505	1.5159	.4852	-.4748	.52
Black	1.5348	-.5643	-1.0509	3.1120	3.5698	-.0459	-1.6399	.31
20-24								
Total	1.4642	.7323	-.3295	2.6901	1.0297	-.2925	-.3222	.69
White	1.1024	.8918	-.2889	2.7870	.7907	.5532	-.4256	.83
Black	5.4521	-.1343	-.6818	2.1400	2.8986	-2.3216	.2857	.08

Table 3B

Implicit Coefficients of U_{PM}: 1978:3

	MALE				FEMALE			
Age-Race	$\frac{S-(S\wedge L)}{P}$	$\frac{U}{P}$	$\frac{E}{P}$	$\frac{R}{P}$	$\frac{S-(S\wedge L)}{P}$	$\frac{U}{P}$	$\frac{E}{P}$	$\frac{R}{P}$
	P1	P2	P3	P4	P1	P2	P3	P4
16-17								
Total	.1051	.2411	-.1001	.0254	.0160	.2273	-.0958	.050
White	.1093	.3160	-.0858	-.0097	.0271	.2710	-.0872	.037
Black	.0897	-.1031	-.1872	.1631	-.0369	.0528	-.1830	.12
18-19								
Total	.0155	.5534	-.0963	.1544	-.0505	.3350	-.0819	.08
White	-.0074	.6405	-.0826	.1137	-.0790	.3993	-.0728	.08
Black	.1227	.2558	-.2043	.3296	.0835	.1556	-.1684	.05
20-24								
Total	.0600	.7820	-.0824	.1745	-.0599	.4918	-.0618	.01
White	.0415	.8370	-.0736	.1718	-.0905	.5376	-.0440	-.00
Black	.2345	.5909	-.1527	.2104	.1207	.3387	-.1908	.1

Table 3C

Implicit Coefficients of W/MW: 1978:3

Age-Race	MALE $\frac{S-(S\wedge L)}{P}$ P1	 $\frac{U}{P}$ P2	 $\frac{E}{P}$ P3	 $\frac{R}{P}$ P4	FEMALE $\frac{S-(S\wedge L)}{P}$ P1	 $\frac{U}{P}$ P2	 $\frac{E}{P}$ P3	 $\frac{R}{P}$ P4
16-17 Total	-.4774	-.2136	.2570	-.0707	-.5827	-.4211	.2082	.206
White	-.4453	-.4525	.2851	-.1431	-.4966	-.4343	.1844	.135
Black	-.7215	.6640	.2238	.1209	-1.0165	-.4865	.9728	.395
18-19 Total	-.4771	-.6632	.1911	-.2976	-.6243	-.2121	.1622	-.03
White	-.4762	-.7328	.1491	-.1151	-.5837	-.1601	.1303	-.05
Black	-.4218	-.3860	.4460	-.7857	-.8797	-.2416	.4702	.010
20-24 Total	-.5435	-1.2411	.1825	-.6549	-.0539	-.1235	.0831	-.157
White	-.4791	-1.2867	.1576	-.6283	.0216	-.0401	.1137	-.291
Black	-1.0187	-.9860	.3465	-.6807	-.5657	-.3967	-.1476	.596

Table 3D

Implicit Coefficients of AF/POP: 1978:3

MALE

	$\frac{S-(S\cap L)}{P}$ P1	$\frac{U}{P}$ P2	$\frac{E}{P}$ P3	$\frac{R}{P}$ P4
16-17				
Total	.1535	-.1499	.0165	-.0944
White	.1979	-.1134	.0129	-.1351
Black	-.0022	-.3133	.1300	.0347
18-19				
Total	.2845	-.1509	-.0441	.1914
White	.3158	-.1082	-.0534	.2297
Black	.1484	-.2810	.0060	.1768
20-24				
Total	.2354	-.3668	.0185	-.0174
White	.2666	-.3181	.0035	.0767
Black	.0940	-.4651	.1108	-.2696

four choices, subject to the linear constraint across equations, we used the logarithm of the pairwise odds as the dependent variables. To illustrate, denote the four youth categories as P_i, $0 < P_i < 1$, $i = 1,2,3,4$, and $\sum_{i=1}^{4} P_i = 1$. The dependent variables are then $\ln (P_i/P_1)$, $i = 2,3,4$. The regressions determine the ratios of the probabilities. The absolute values can then be estimated using the condition that the sum of probabilities is equal to unity. The implicit coefficients of the respective independent variables can be obtained by numerical estimation. Based on the coefficients from the P_i/P_1 equations, the probabilities were computed by changing one specific right-hand-side variable by one percent. These computed probabilities were compared with the corresponding original estimates to derive the implicit elasticities at a given period. These numerically derived elasticities for the third quarter of 1978 are reported in Table 3 by each variable.[19]

B. The Impact of RPy

For the constrained U/P equations, 6 of the male and 5 of the female equations had the anticipated sign of RPy. It is interesting that the incorrect signs appeared in the black equations in all but one case. Does this suggest that the labor market position for black youths has improved with demographic overcrowding?

To analyze this puzzling result, it is necessary to evaluate the other three activity equations. The equations indicate that the negative coefficients of RPy in the U/P equations do not indicate an improvement in blacks' labor market position. Of particular importance are the E/P equations. For all but three of the eighteen equations, E/P is negatively related to RPy. The only equation for blacks where the coefficient is positive is females age 20-24. Moreover, the implied elasticities of RPy in the E/P equations are considerably larger for blacks than for whites.

The public policy debate on youth unemployment invariably is in terms of the BLS unemployment rate variable, U/L. It is therefore useful to convert the U/P and E/P equations of Table 3 so that their implications for the more traditional unemployment rate variable can be analyzed. The results are shown in Table 4. Column 1 of Table 4 shows that the elasticity of U/L with respect to RPy has the anticipated positive sign in all but two equations (black females age 16-17 and 20-24).

The results of Tables 3 and 4 make it clear that both black and white youth labor market positions are adversely affected by demographic overcrowding. However, the response pattern of the two groups differs. For white youth, unemployment increases are large and are not offset by changes in labor force participation rates. For black youth, the unemployment response to RPy appears low, but this is mainly because of a sharp decline in participation rates.

Given the linear restriction across equations, an increase in one of the P_i's requires a reduction in another. What happens to those workers who are not employed as a result of cohort overcrowding? The implicit coefficients of RPy in the $(S-(S \cap L))/P$ and R/P equations provide an answer.

Table 4

Percent (%) Change in Unemployment Rates* due to One Percent Change in Respective Explanatory Variable in 1978:3, Derived From Constrained Equations

Unemployment Rates

Age Race	MALE RPy	U_{PM}	AF/POP	W/MW	FEMALE RPy	U_{PM}	W/MW
16-17 Total	.4694	.2844	-.1387	-.3916	.0695	.2567	-.5133
White	.4956	.3430	-.1078	-.6284	.2511	.2879	-.5268
Black	.8095	.0556	-.2928	.2896	-.1867	.1407	-.8876
18-19 Total	.6835	.5744	-.0944	-.7545	.7408	.3638	-.3109
White	.7403	.6523	-.0495	-.7951	.8408	.4122	-.2473
Black	.3703	.3472	-.2166	-.6260	1.0294	.2070	-.4498
20-24 Total	.9804	.7962	-.3548	-1.3103	.0281	.4964	-.1873
White	1.1025	.8486	-.2998	-1.3451	.9174	.5505	-.1262
Black	.4660	.6293	-.4872	-1.1259	-2.0224	.4125	-.1907

*Unemployment Rates ≡ U/(E+U+M)

Essentially, an increase in RPy, ceteris paribus, leads to an increase in U/P, a decrease in E/P, an increase in $(S-(S \cap L))/P$ and an increase in R/P. The displaced employed workers largely migrate to full-time school and/or to household activities. This is not, however, the complete story of the demographic overcrowding because of the ceteris paribus assumption. For example, government policy, responding to the effects of demographic overcrowding, may also affect the distribution of the youth population across the four activity categories. When the AF/POP and W/MW are removed from the schooling equation, the sign on RPy becomes negative for white males. In addition, the TREND term poses obvious problems in the female equations. Since the intermediate-run demographic swings are highly correlated with a trend variable over the short estimation period, it is likely, that TREND will capture some of these affects. That is, RPy does not reflect the full effect of demographic overcrowding because changes in other variables should also be anticipated.

C. The Impact of U_{PM}

The cyclical variable, U_{PM}, produced the anticipated results. As illustrated in Table 3, increases in U_{PM} are associated with little change in schooling, an increase in U/P, a decrease in E/P and an increase in R/P.

The elasticities of U/P with respect to U_{PM} are the largest for white males. In addition, the elasticities tend to be larger for whites than for blacks, males than for females, and older than for younger workers. For all age-sex-race categories the elasticities are less than unity.

The overall results suggest a ranking of youth groups in terms of the cyclical vs. structural sensitivity of their unemployment rates (U/P). In general, youths are more structually than cyclically sensitive in comparison with non-youth. Females and the youngest youth groups are the most sensitive group to structural, rather than cyclical, swings in unemployment.

The ranking is also reflected in industry employment. For example, the older male groups have a high concentration of employment in the high wage, cyclically sensitive industries such as mining, manufacturing and construction. The younger and female groups are more heavily represented in the low wage, acyclical industries such as retail and service. Industry employment patterns, however, cannot be viewed simply as a causal factor in the unemployment behavior of these groups. Rather, the underlying structural features of these groups' labor market behavior is likely to determine their industry employment. For example, the 16-17 age group, looking for part-time, after school work, is most suited for employment in the retail and service sectors. Training costs and work scheduling in industries such as manufacturing are not suitable for this group's casual labor market attachment.

The ranking of black and white groups, in terms of the cyclical vs. structural issue, is more difficult than ranking age-sex groups. Although blacks have a lower elasticity of U/P with respect to U_{PM}, it is necessary to inspect the E/P as well as the U/P equation. Of particular interest is that black youths have a considerably higher E/P sensitivity to the business cycle than whites. That is, black youths have a lower U/P, but a higher E/P elasticity with respect to U_{PM}. Since blacks and whites tend to be equally employed, in percentage terms, in the high and low wage industries, the cyclical nature of different industries cannot be a factor.

One possible interpretation is that the black youth labor market response is more closely related to fluctuations in layoffs and hires. On the other hand, changes in the labor market status for white youth, as reflected in reentrant and new entrant rates may be relatively more important. In any case, the ranking across races is more complex than across age and sex groups.

D. The Impact of W/MW

The relative wage term exhibits the consistent and anticipated signs in the constrained equations.[20] For all but one demographic group, changes in schooling, unemployment and the residual category are inversely related, while changes in employment are directly related to movements in W/MW. In other words, an increase in the youth market wage, ceteris paribus, is related to a shift into employment and out of all other activities.

Of particular interest is the relationship between unemployment (U/P) and W/MW. As previously suggested, the youth unemployment rate depends upon the cost of being unemployed. Interpreting MW as a proxy for the reservation wage, an increase in the market wage, W, leads to an increase in the cost of unemployment and hence a decrease in the unemployment rate. To the extent that W/MW represents a minimum wage variable, however, the decrease in U/P, following an increase in W/MW, would be intepreted as a demand side effect. These two views cannot be isolated on the basis of the time series data.

The one category which shows a mixed pattern with respect to W/MW is the residual category, R. For the female equations, the three black groups and one white group are positively related, while the two white groups are negatively related to W/MW. Given the composition of R, a priori predictions of the signs of the coefficients are not obvious. One factor, however, is that the female R category contains many more home-workers that are raising families than the male R category. The resulting sign pattern is thus compatible with a demographic overcrowding interpretation. In particular, a deterioration in W/MW may reduce completed family size and lead to an exit from R on the part of females. Since this household behavior response is not likely to be a factor in the male equations, the cost of unemployment argument should be dominant and explain the negative coefficient of W/MW.

E. The Impact of AF/POP

The armed forces variable has an important role in distinguishing between the unemployment rate patterns for whites and blacks. First, this variable has had a large variance over the estimation period, rising sharply during the Vietnam War and then declining close to its pre-war levels during the mid to late 1970's. Second, the black and white male groups respond differently to AF/POP. Unfortunately given the data period variation in AF/POP, especially its sharp increase to a peak value in the early 1970's parallels RPy. This may reduce the confidence that can be placed in separately interpreting these two quite independent variables.

In the unemployment equations, the implicit coefficient of AF/POP was negative in each of the nine male equations. The white and black equations, however, indicate a much greater sensitivity of black unemployment to military employment. This may help to explain the fact that black youth unemployment has increased since 1970 relative to white youth. Since both the percentage of the military that is black and the percentage of blacks in the military have increased since the change to all volunteer forces, the decline in AF/POP cannot be blamed for the unemployment trends.

The major differences in employment response also reflect the greater sensitivity of black labor market conditions to the level of military employment. For employment, the coefficient differences between whites and blacks are particularly large. Indeed, white employment in the 18-19 age group actually declines with increases in military employment. This is particularly surprising since E/P includes M as being employed. In other words, an increase in the military is associated with a decline in civilian employment for whites, age 18-19 that is larger than the number of whites who enter the military.

The differential white-black response pattern also holds for schooling. The increase in AF/POP is associated with a much

272

larger increase in white than in black schooling. This is probably capturing behavior during the draft period when increases in AF/POP encouraged youth to remain or return to school to secure student deferments.

V. Considerations in the Deterioration of the Black Youth Labor Market

A. Unemployment and Labor Force Developments

Two basic factors suggest a deterioration in the labor market position for black relative to white youth during the 1970's. The first is that black youth unemployment increases throughout the 1970's. The second is that black youth E/P ratios fell over most of the past decade while white E/P ratios were increasing.[21]

Since increases in unemployment may be less of a problem if attributable to increases in participation rates, it is important to consider labor force and unemployment developments together. For black males, the participation rates decreased substantially for all age groups, while the rates for whites increased for all age groups. For females, the situation is somewhat different. Both whites and blacks showed increasing participation rates during the period. However, the percentage growth in participation rates were much smaller for blacks than for whites for all female cohorts. In sum, these changes in unemployment and participation rates suggest a deterioration in labor market conditions for blacks, especially for black males. (See Table 5).

We have generally attributed the youth unemployment developments of the past decade to supply side factors. In the case of black males, however, the data on U/L and E/P may indicate a possibly different picture. Presumably, increases in U/L combined with decreases in L/P give, at least the impression, of a

Table 5

Unemployment Rates and Employment/Population Ratios: by Age-Race-Sex

	Unemployment Rates[a]			Employment Ratios[b]		
	1965	1972	1978	1965	1972	1978
			MALE			
White						
16-17	14.84	16.55	17.08	38.91	42.44	46.31
18-19	11.53	12.54	10.92	63.53	65.17	69.18
20-24	5.95	8.55	7.65	83.36	79.93	82.00
Black						
16-17	27.78	36.66	40.71	28.97	22.52	20.47
18-19	20.13	26.40	30.90	56.87	48.61	46.59
20-24	9.29	14.79	20.13	83.38	72.81	66.29
			FEMALE			
White						
16-17	15.17	16.90	17.08	24.47	32.57	40.64
18-19	13.63	12.27	12.34	43.76	50.48	56.81
20-24	6.31	8.16	8.27	46.16	54.61	63.79
Black						
16-17	39.67	35.56	41.87	12.55	13.23	16.03
18-19	28.01	38.64	36.81	28.88	27.01	31.41
20-24	13.79	17.44	21.56	47.71	47.04	49.81

a) The unemployment rates are defined as U/L

b) The employment ratios are defined as E/P where both E and P include the military.

deterioration in demand conditions. To what extent has the demand for black males shifted adversely relative to whites and black females.

B. Trends in Secular Wages

Whereas the employment situation has worsened for blacks relative to whites, the relative wages for blacks have increased continuously during the last decade. The overall white median usual weekly earnings for full-time, wage and salary workers increased by 6.7 percent per year between 1967 and 1977. However, the corresponding wage growth for blacks was 8.0 percent on average during the same period. The black-white wage ratios increased from 0.692 to 0.776 for males and from 0.797 to 0.936 for females during this period.

The full-time usual weekly earnings for youth whose major activities are other than school also show a similar pattern. Here again, the gap between black and white wage differentials has narrowed over time. Except for females age 16-17, the wage of all black groups rose more than those of the comparable white groups. The black-white wage ratios increased from 0.832, 0.735 and 0.740 to 0.973, 0.799 and 0.868 for males age 16-17, 18-19 and 20-24 groups respectively between 1967 and 1978. For females, the corresponding ratios changed from 1.125, 0.829 and 0.830 respectively to 0.914, 1.034 and 0.928. The puzzling development is that the groups with the most unfavorable unemployment-employment indicators enjoyed the best earnings growth.

C. Trends in Industry Employment

To further explore the issue of deteriorating U/L and E/P rates coupled with increasing relative wages, for black youth, it is useful to explore the industry employment of black and white youth. For ease of analysis, we use the percentage of each youth group which is employed in the retail and service sector, compared with total employment of each demographic group. The retail and service sectors are the major employers of youth and are the lowest wage sectors. The data, presented in Table 6, illustrate two overall developments. First, the percentage of black employment that is found in the lowest wage sectors is approximately equal to the percentage of white employment in these sectors. There are slightly more black males but many fewer black females (as a percentage), in comparison with white groups, in the low wage sectors. Second, changes in the percentage of low wage employment has worsened for black relative to white males, but improved for black relative to white females.

What is clear about these statistics is that they are not of great help in clarifying the puzzle. As a compositional issue, the improvement in black relative wages cannot be explained by the fact that their occupational status was unchanged. However, there is also no evidence of a significant deterioration in the employment status of black males that could explain their declining employment-population ratios and rising unemployment rates.

Table 6

Proportion of Each Group's Employment that is in Low Wage Industries (i.e. Service and Retail)

	MALE			FEMALE		
	1968	1972	1978	1968	1972	1978
White						
16-17	.7270	.7392	.7290	.8239	.8422	.8706
18-19	.4763	.5298	.5105	.5440	.6554	.6810
20-24	.3232	.3787	.3804	.5287	.5975	.6148
16-21(out of school)	.3650	.4657	.4446	.4914	.6129	.6399
16-21(in-school)	.7765	.7833	.7929	.8881	.8967	.9051
16+	.3037	.3317	.3449	.5755	.6124	.6200
Black						
16-17	.6617	.7013	.7435	.8291	.7655	.8315
18-19	.4583	.4393	.5429	.5738	.6126	.6514
20-24	.3012	.3500	.3816	.5453	.5267	.5536
16-21(out of school)	.3519	.4220	.4583	.5277	.5519	.6150
16-21 (in-school)	.7603	.7831	.8167	.8537	.8511	.8513
16+	.3256	.3307	.3457	.6429	.6350	.6121

For those who believe that each age-sex-race group has its own RPy_i variable as the proper cohort overcrowding variable, there is no problem in explaining the declining black male employment ratios. Specifically, the ratio of black youth employment to white youth employment (where employment includes the military) has been virtually unchanged since 1965. According to the "RPy_i" model, the entire deterioration in E/P ratios for black males can thus be associated with their increasing percentage in the youth population. Since we believe that overcrowding is better defined over youth as a single group, we do find this result a compelling explanation. Moreover, the puzzle of declining E/P ratios for black males combined with increasing relative wage rates cannot be attributed to the higher growth rate of the black youth population.

D. Trends in School Enrollment

One of the main distinctive features between white and black groups over the last decade is that the school enrollment rates for all black groups increased substantially more than those for whites. Except for females age 20-24, the enrollment rates for whites. decreased for all age-sex groups between 1965 and 1978. During the same period, the enrollment rates for blacks consistently increased. Furthermore, although the enrollment rates for all black age-sex groups were lower than those for the corresponding white groups in 1965, the situation was reversed by 1978. That is, by 1978, the enrollment rates for all black age-sex groups were higher than the comparable white groups.

Does the increase in school enrollment rates for black males equal the decline in their E/P rates? The answer can be seen by comparing Tables 5 and 7. The increase in school enrollment captures almost all of the decline in E/P for black males age 16-17. For black males age 18-19, it picks up 4 of the 10 percentage point decline. For the black male group, age 20-24, a 17 percentage point decline in E/P is reduced to 10 percentage points when S/P is added. Perhaps as important, is that the wide gap between E/P rates for whites and blacks becomes a very narrow gap for most age-sex groups when $(E+(S\cap E))/P$ is used as an indicator of labor market position.

The nature of the problem depends upon how one evaluates schooling vs. employment for youth. In level terms as of 1978, white youths enjoy an advantage in the combined employment plus schooling ratio, over comparable black youths. The trend is less obvious. The increase in white employment ratios is, in part, due to their declining school enrollment and increasing part-time work while in school. The decrease in black employment ratios is, in part, due to their increasing school enrollments. In addition, black enrollment has gained without a significant increase in after-school work (comparable to that found for white enrollees).

Table 7

Employment + School[a]
Population
1965 and 1978

	1965	1978
Male , White		
16-17	88.0	87.6
18-19	91.0	90.0
20-24	94.0	91.1
Male , Black		
16-17	83.2	82.0
18-19	83.0	77.0
20-24	88.9	78.5
Female , White		
16-17	80.0	83.1
18-19	71.0	77.6
20-24	52.7	71.2
Female , Black		
16-17	74.0	77.0
18-19	56.9	61.4
20-24	52.5	59.5

a) The specific measure is : $\frac{E+M\div S-(S\wedge E)}{P}$

VI. Summary

In this paper we have advanced the argument that the deterioration in the absolute and relative youth unemployment ratios is due primarily to a cohort overcrowding effect. Other variables that seem to have a role are the declines in the size of military service since the Vietnam War, the decline in the market wage for youth relative to some combination of minimum wages and government transfer programs, and a cyclical variable representing changes in demand. Since we control for the business cycle, which does not have a secular trend, the deterioration in the labor market position for youth over the past two decades can be attributed to labor supply factors. That is, the increasing unemployment rate of this group represents an increase in their equilibrium unemployment rate due to overcrowding and the effects of government labor market and social welfare programs.

The BLS measured unemployment rate is usually the main piece of evidence indicating the declining labor market position of youth. Although we agree that an important decline has taken place, the magnitude of the job decline is overstated by the BLS statistics. Indeed, we argue that the BLS youth unemployment rate is a very weak statistic for policy purposes. Other measures of unemployment and/or employment ratios show less decline than do the BLS measures. For example, the percentage of youths who are either employed or in school is only slightly down from the 1965 levels. We argue that this variable, or an unemployment rate construct which treats schooling as equivalent in status to employment, is more useful as an indicator of the labor market position of youth with respect to jobs.

Whereas the job decline is less serious than the BLS unemployment rate indicates, the decline in the relative wage of youth may be more central to the relevant issues. That is, the labor market problem of youth is more a problem of low skill and hence low wage levels than of a lack of jobs. The increasing employment-population ratios for most youth groups, in spite of the high increase in their population, is one source of evidence of the ability of the economy to create large numbers of youth jobs.

Black males are the one sex-race youth group that combines steadily deteriorating unemployment and employment ratios. There are problems, however, in determining to what extent the overall position of this group has declined. First, the relative wage for black youths, both males and females, has improved relative to white youths. Second, the decline in employment and increase in relative wages have not been matched by a significant change in the proportion of black males in the low wage industries. The percentage of black male employment remains approximately the same as the percentage of white male employment in the low wage sectors. Finally, school enrollment rates have been increasing for blacks and decreasing for whites. As a result, the ratios of those employed plus those in school, as a percentage of the relevant population, show less of a difference between black and white youth than the employment ratios alone. But, from a social welfare perspective, it is difficult to weigh the increase in joblessness against the increase in relative wages and school enrollment.

The increase in the percentage of black males who are both out of school and not employed implies that a component of the black male youth population has suffered a significant decline in their relative economic status. This suggests for black males, age 16-24, there may be a growing divergence in labor market performance.

Footnotes

[1] See, for example, Wachter (1972), (1976b), (1977), Kim (1979). This work builds upon Easterlin (1968). Several relevant studies and a detailed bibliography are contained in Espenshade and Serow, eds. (1978). More recent work which develops this approach includes Ehrenberg (1979), Welch (1979), and Reubens (1979).

[2] For a detailed discussion of the endogenous taste model for explaining economic-demographic variables, see Easterlin, Pollak and Wachter (forthcoming). The relative income model is presented in Easterlin (1968) and Wachter (1972),(1976b).

[3] See, for example, Cain and Watts, eds. (1973).

[4] The statistical problems of measuring the youth labor force is stressed by Clark and Summers (1979).

[5] This model is drawn from Wachter and Wachter (1978).

[6] In equations (3) and (4) it is assumed that experience or skill can only be acquired with age. The result is that the number of A workers only increases with the population and participation rates of A workers. In fact, the rate of accumulation of skill can be increased by more intensive training. The cost for training is likely to be upward sloping and steeper in the short than in the long run. Consequently, the accumulation of human capital will be slowed as workers spread their training to avoid the higher short-run costs. (This factor of increasing

cont'd
Footnotes

short-run supply costs is also a factor in the lag of actual capital behind its optimal level.

[7] An alternative measure of labor market pressure, denoted UGAP, yielded similar results. The U_{PM} variable was used instead of UGAP because the latter contains the unemployment rate of youth. For a discussion of UGAP, see Wachter (1976a).

[8] See, for example, Ragan (1977).

[9] In this paper, the terms blacks and nonwhites are used interchangeably.

[10] An alternative variable, W/MW*C, where C is the coverage rate, did not perform as well across equations. Especially given the lack of success of the coverage variable, our W/MW cannot be interpreted as a straight minimum wage effect. As indicated, it cannot be empirically differentiated, in most equations, from a supply side variable that measures changes in government transfer programs.

[11] For a detailed discussion of the problems with measuring government policy variables, see the original NBER discussion paper.

[12] The impact of welfare programs has received relatively limited attention until recently. See, Levitan et. al. (1972), Garfinkel and Orr (1974), Saks (1975), Williams (1975), Levy

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Footnotes

(1979) and the Studies in Public Welfare of the Joint Economic Committee (1973).

Major studies of minimum wage laws include Moore (1971), Kosters and Welch (1972), Goldfarb (1974), Gramlich (1976), Mincer (1976), Welch (1976), (1977), Ashenfelter and Smith (1979), and U.S. Department of Labor (1970).

For several relevant models on the impact of direct job creation see Killingsworth and Killingsworth (1978) and Palmer (1979).

[13] Some of the relevant papers that provide an empirical framework for the youth unemployment problem include Kalachek (1969), Doeringer and Piore (19710, R.A. Gordon (1973), R.J. Gordon (1977), and Adams and Mangum (1978).

Recent empirical time series studies on youth unemployment which address this same phenomenon include Freeman and Medoff (1979, Ragan (1977), Thurow (1977), and the conference on Youth Unemployment (1978).

[14] Conceptual problems with the definition of the unemployment rate for youth are stressed by R.A. Gordon (1973), Levitan and Taggart (1974), and Clark and Summers (1979).

[15] The $\cap$ notation indicates the intersection of two variables. Hence, $S \cap L$ indicates those who are in school and in the labor force.

[16] The results were included in the original NBER working paper prepared for the conference.

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Footnotes

[17] Relevant studies on schooling include Freeman (1976) and the recent comment by Smith and Welch (1978). Kim (1979) investigates the complexities of the military and schooling relationship with the youth labor market. A very useful collection of essays is found in the NCMP Volume, From School to Work: Improving the Transition.

[18] One of the major questions concerning the R category involves the issue of discouraged workers. The view that the number of disadvantaged potential workers in the R group is significant is stressed by, among others, Doeringer and Pioré (1971) and Harrison (1972).

[19] For those who prefer to analyze estimated coefficients directly, the equations for the four activities, unconstrained by $\sum_{i=1}^{4} P_i = 1$ were presented in the original NBER working paper.

[20] In the unconstrained equations, the pattern of the signs is unchanged, but the variable is only marginally significant.

[21] Studies which focus on minority unemployment include Doeringer and Pioré (1971), Harrison (1972), Wallace (1974), the Congressional Budget Office (1976), Adams and Mangum (1978), and Osterman (1978).

Bibliography

Adams, Arvil V. and Mangum, Garth. 1978. The Lingering Crisis of Youth Unemployment, Kalamazoo, Michigan, W.E. Upjohn Institute.

Ashenfelter, Orley, and Smith, Robert S. April 1979. "Compliance with the Minimum Wage Law", Journal of Political Economy, 333-350.

Cain, Glen G. and Watts, Harold W. eds. 1973. Income Maintenance and Labor Supply, Institute for Research on Poverty Monograph Series.

Clark, Kim and Summers, Lawrence. 1:1979, forthcoming. "Labor Market Dynamics and Unemployment: A Reconsideration," Brookings Papers on Economic Activity.

Congressional Budget Office 1976. The Teenage Unemployment Problem: What are the Options? Washington, D.C. U.S. Government Printing Office.

Doeringer, Peter B., and Piore, Michael. 1971. Internal Labor Markets and Manpower Analysis. Lexington, Mass.: D.C. Heath.

Easterlin, Richard A. 1968. Population, Labor Force and Long Swings in Economic Growth: The American Experience, Columbia University Press for the National Bureau of Economic Research.

_________, Pollak, Robert A. and Wachter, Michael L. "Toward a More General Economic Model of Fertility Determination: Endogenous Preferences and Natural Fertility," Population and Economic Change in Less Developed Countries, New York: National Bureau of Economic Research, forthcoming.

Ehrenberg, Ronald G. 1979. "The Demographic Structure of Unemployment Rates and Labor Market Transition Probabilities," paper prepared for the National Commission for Manpower Policy.

Espenshade, Thomas J. and Serow, William J., eds. 1978. The Economic Consequences of Slowing Population Growth, Academic Press.

Freeman, Richard B. 1976. The Overeducated American, Academic Press.

______, April 1978. "The Effects of Demographic Factors on the Age-Earnings Profile in the U.S."

Bibliography cont'd

Freeman, Richard B., and Medoff, J.L. May 16-17, 1979. "The Youth Labor Market Problem in the United States: An Overview," paper prepared for a National Bureau of Economic Research Conference on Youth Unemployment.

Garfinkel, Irwin, and Orr, Larry L. July 1974. "Welfare Policy and the Employment Rate of AFDC Mothers," National Tax Journal 27, 275-284.

Goldfarb, Robert S. "The Policy Content of Qualitative Minimum Wage Research," IRRA 27th Annual Winter Proceedings, 261-268.

Gordon, R.A. 1973. "Some Macroeconomic Aspects of Manpower Policy." In Ulman, Lloyd, ed., Manpower Programs in the Policy Mix. Baltimore: Johns Hopkins Press.

Gordon, Robert J. 1977. "Structural Unemployment and the Productivity of Women", Carnegie-Rochester Conference Series on Public Policy: Stabilization of the Domestic and International Economy, Karl Brunner and Allan Meltzer, eds., 181-229.

Gramlich, Edward M. 1976. "Impact of Minimum Wages on Other Wages, Employment, and Family Income," Brookings Papers on Economic Activity, 2. 409-461.

Harrison, Bennett. 1972. Education, Training, and the Urban Ghetto. Baltimore, Md.: Johns Hopkins University Press.

Kalachek, Edward. 1969. "Determinants of Teen Age Unemployment." Journal of Human Resources. 3-21.

Killingsworth, Charles C., and Killingsworth, Mark R. 1978. "Direct Effects of Employment and Training Programs on Employment and Unemployment: New Estimates and Implications for Employment Policy," In Conference Report on Youth Unemployment: Its Measurement and Meaning, Washington: U.S. Government Printing Office, 249-286.

Kim, Choongsoo. 1979. unpublished manuscript. "A Study of the Military Labor Market," University of Pennsylvania.

_____, 1979. unpublished manuscript. "A Study of the School Enrollment Rate: An Empirical and Theoretical Investigation," University of Pennsylvania.

Kosters, Marvin and Welch, Finis. June 1972. "The Effects of Minimum Wages on the Distribution of Changes in Aggregate Employment," American Economic Review, 323-334.

Levitan, Sar A; Rein, Martin: and Marwich, David. 1972. Work and Welfare Go Together. Baltimore, Md.: Johns Hopkins University Press.

Bibliography cont'd

Levitan, Sar A. and Taggart, Robert III. 1974. Employment and Earnings Inadequacy: A New Social Indicator. Baltimore, Johns Hopkins Press.

Levy, Frank. Winter 1979. "The Labor Supply of Female Household Heads, or AFDC Work Incentives Don't Work Too Well," Journal of Human Resources.

Mincer, Jacob. August 1976. "Unemployment Effects of Minimum Wages" Journal of Political Economy, Part 2, S87-S104.

Moore, Thomas G. July/August 1971. "The Effect of Minimum Wages on Teenage Unemployment Rates," Journal of Political Economy, 897-903.

National Commission for Manpower Policy, 1976. From School to Work: Improving the Transition, Washington: U.S. Government Printing Office.

Osterman, Paul. 1978. "Racial Differentials in Male Youth Unemployment", Conference Report on Youth Unemployment: Its Measurement and Meaning. Washington: U.S. Government Printing Office.

Palmer, John L. 1978. Creating Jobs: Public Employment Programs and Wage Subsidies, The Brookings Institution.

Perry, Charles R., Anderson, Bernard E., Rowan, Richard L. and Northrup, Herbert R. 1975. The Impact of Government Manpower Programs. Philadelphia. Industrial Relations Unit. University of Pennsylvania.

Ragan, James F. Jr. May 1977. "Minimum Wages and the Youth Labor Market", Review of Economics and Statistics, 129-136.

Reubens, Beatrice G. February 1978. The Measurement and Interpretation of Teenage Unemployment in the United States and Other Countries, U.S. Department of Labor, ASPER, NTIS PB284161/AS.

Saks, Daniel H. 1975. Public Assistance for Mothers in Urban Labor Market, Industrial Relations Section, Princeton University.

Smith, James P. and Welch, Finis. November 1978. "The Overeducated American? A Review Article", The Rand Paper Series.

Bibliography cont'd

Studies in Public Welfare: Staff Studies Prepared for the Use of the Subcommittee on Fiscal Policy of the Joint Economic Committee Congress of the United States, Washington: U.S. Government Printing Office.

Thurow, Lester C. Fall 1977. "Youth Unemployment," Rockefeller Foundation Working Paper.

U.S. Department of Labor, 1970. Youth Unemployment and Minimum Wages, Bulletin 1657, Washington: U.S. Government Printing Office.

Wachter, Michael L. May 1972. "A Labor Supply Model for Secondary Workers," Review of Economics and Statistics, 141-151.

___, 1:1976. "The Changing Cyclical Responsiveness of Wage Inflation Over the Postwar Period" Brookings Papers on Economic Activity, 115-159 (a).

___, December 1976. "The Demographic Impact on Unemployment: Past Experience and the Outlook for the Future," Demographic Trends and Full Employment, National Commission for Manpower Policy, Special Report No. 12, 27-99. (b)

___, 2:1977. "Intermediate Swings in Labor-Force Participation", Brookings Papers on Economic Activity, 545-570.

___, and Wachter Susan M. 1978. "The Fiscal Policy Dilemma: Cyclical Swings Dominated by Supply-Side Constrain, In The Economic Consequences of Slowing Population Growth, edited by Thomas J. Espenshade and William J. Serow, Academic Press, Inc., 71-99.

Wallace, Phyllis A. 1974. Pathways to Work-Unemployment Among Black Teenage Females. Lexington, Mass.: Health Lexington Books.

Welch, Finis. 1977. "Minimum Wage Legislation in the United States," In Evaluating the Labor-Market Effects of Social Programs, edited by Orley Ashenfelter and James Blum, Industrial Relations Section, Princeton University.

___, January 1979. "Effects of Cohort Size on Earnings: The Baby Boom Babies' Financial Bust", University of California, Los Angeles, Working Paper.

Williams, Robert G. 1975. Public Assistance and Work Effort: The Labor Supply of Low-Income Female Heads of Household, Industrial Relations Section, Princeton University.

Economic Determinating of Geographic and Individual Variation in the Labor Market Positioned by Persons

Richard B. Freeman

Relatively high and increasing rates of joblessness and decreasing earnings for young persons relative to older persons constitute one of the major labor market problems in the United States and other countries in the 1970's. Several hypotheses have been offered to explain the deteriorated economic position of young persons. Some cite macro-economic factors and the general weakening of the job market as the major cause of high youth unemployment rates. Others emphasize the role of the minimum wage and related market rigidities. Yet others have stressed the demographic changes of the period, which took the form of sizeable increases in the relative number of young workers.[1] While the issue is one of changes over time, the available time series, though useful, lacks sufficient variation to provide strong tests of the competing hypotheses or to provide estimates of the impact of the full set of possible explanatory factors.

This paper uses evidence on variation in the labor force activity of young persons across Standard Metropolitan Statistical Areas (SMSA's) and evidence on the variation in labor force activity among individuals to analyze the determinants of the labor market for young persons.[2] The geographic and individual data offer different and, it can be argued, somewhat better "experiments" for testing various proposed causal forces than do often collinear time series. The data on geographic areas provides a reasonably large sample of observations with considerable variation in measures of the labor market position of the young and in explanatory variables. The major disadvantage of the geographic evidence is that variation across regions may reflect regional differences in 'competitiveness'—the performance of one SMSA versus another--that provides little insight into the possible causes of aggregate problems. Another potential problem is that correlations of factors across areas can give a misleading picture of the determinants of the positinn of individuals (i.e., ecological correlation bias). Blacks could, for example, have lower labor participation rates than whites within every SMSA but reside in SMSA's having (for unknown reasons) high labor force participation rates. This would produce a positive correlation between the percent black in an area and participation, when in fact blacks have lower participation rates than whites. Data on individuals provides a better means of analyzing the effect of individual characteristics on the labor market position of the young and is used for that purpose.

The paper begins with a brief review of the ways several proposed causes of youth labor market problems can produce joblessness and then analyzes the differences in youth employment, unemployment, and labor force participation across SMSA's and among individuals.

There are four basic findings:

1) Geographic variation in the employment, unemployment, and labor force participation of young workers depends in large measure on idenfifiable supply and demand conditions in local labor markets, including the relative number of young persons, the ratio of homes below the poverty level, the rate of unemployment of prime age men, the rate of growth of personal income, and the proportion of jobs in young-worker-intensive industries.

2) The employment and wages of young persons depend on different personal and background factors. Being black or coming from families with certain socioeconomic problems affects the probability of employment does not affect wages. The different effect of variables on employment than on wages highlights the extent to which there is a distinct youth employment problem.

3) Determinants of youth employment often have the same directional impact on youth labor force participation rates, with the result that

they have little effect or occasionally a contradictory effect on unemployment rates. This suggests that analyses focusing on unemployment can give misleading inferences about the determinants of the youth labor market position.

4) While the cross-SMSA regression models tell a roughly similar story about the determinants of the youth labor market as comparable time series regressions, neither cross-section nor time series analyses explain the performance of the youth labor market in the 1970s, when employment to population rates held steady and labor participation rates rose, despite adverse changes in their putative determinants. Widespread concern about youth joblessness notwithstanding, the story of the 1970s is not one of reduced youth work activity, with the marked exception of young blacks.

Causes of Youth Labor Market Problems

The factors that underly youth employment problems can be examined with standard partial equilibrium models of the job market, in which supply and demand determine equilibrium employment and wages and in which joblessness (above frictional levels) results from failure to attain market clearing wages, either because wages respond relatively slowly (for diverse reasons) to rapid changes in demand or supply or because of rigidities such as legislated minima. To illustrate the way in which dynamic shifts in demand or supply and sluggish wages adjustments can produce joblessness, consider the following simple model:

(1) Supply: $\ln S = \varepsilon \ln W + Bt$

(2) Demand: $\ln D = -\eta \ln W + At$

(3) Wage Adjustment: $\Delta \ln W = \psi(\ln D - \ln S)$

where S = supply of labor; D = demand for labor; W = wage; A = shift in demand per unit time; B = shift in supply per unit time, ε = elasticity of supply; and η = elasticity of demand.

Joblessness occurs in the system (1)-(3) because wages respond to disequilibrium with a lag. Since $\ln D - \ln S = -(\eta + \varepsilon)\ln W + (A-B)t$, $\Delta(\ln D - \ln S) = -(\eta + \varepsilon)\Delta\ln W + (A-B)$. Solving for the "equilibrium"[3] level of unemployment we get $\ln S - \ln D = (B-A)/(\eta + \varepsilon)\psi$. When supply increases more rapidly than demand ($B > A$), the slow adjustment of wages produces unemployment in the relevant time period. Relatively slow movement in wages could result from the normal process of wage determination in an economy with long term contracts and unexpected or uncertain shocks or from any other factors which might limit the extent of adjustment in a given period.

The analysis of shifts in the schedules directs attention to the factors causing the supply of young workers to increase significantly or causing the demand for young workers to decrease significantly.

The major potential cause of increased supply is the sizeable expansion of the youth population, which resulted from the baby boom of the fifties and sixties. The 'demographic hypothesis' seeks to explain many of the labor market problems of young workers as a result of their number relative to the number of older workers, given noninfinite elasticities of substitution among workers by age. If the hypothesis is correct, many of the problems will diminish in the 1980s as the number of young persons declines as a share of the total population.

Two basic types of shifts in demand are likely to contribute to the joblessness problem. First are shifts due to changes in the overall level of economic activity, such as cyclical declines or a longer-run slowdown in the rate of growth. When aggregate demand declines or grows slowly, the relatively permanent status of older workers, seniority layoff policies, and the reduction in new hires will have significant effects on the demand for the young. The second type of shifts involve structural changes in the mix of industries and occupations or in the supplies of workers who can substitute for the young, such as illegal aliens willing to undertake unpleasant tasks for low wages, and/or adult women, who at existing wages may be preferred by employers for certain entry-level positions.

Failure of wages to attain market-clearing levels due to rigidities like the minimum wage represents another potential cause of youth joblessness. In contrast to failure to clear due to sluggish adjustment, failure to clear because of the minimum can produce joblessness even in periods of stable supply and demand if the minima is above the equilibrium rate.

In addition to shifts in demand and supply due to general market or demographic factors, the labor market for some groups of youths may be adversely affected by more complex social forces, whose impact is difficult to measure with the type of data currently available. One such set of factors pertains to opportunities for work and earnings outside the mainline economy, ranging from casual street jobs to crime, which offer a viable alternative to normal labor force activity. Another set of factors relates to possible disparities between the skills of young persons from disadvantaged backgrounds and their aspirations and willingness to take 'undesirable jobs. Yet another relates to the conditions of the individual's family or community: for diverse reasons, those from welfare homes or from communities with extreme welfare or poverty may have greater problems in obtaining jobs than other youngsters. Finally, for discriminatory or other reasons, black youngsters are well-known to face especially poor employment prospects.

The current study focuses largely on the contribution of differences in broad supply and demand forces to youth joblessness and touches only briefly on the more complex social factors mentioned above. The geographic data set is well-suited to analyze the effect of broad market forces on youth because these forces vary substantively across SMSA's and can be viewed as appropriate indicators of labor market conditions. The data set on individuals provides appropriate information with which to assess the incidence of joblessness among young persons with different characteristics but lacks the information on incentives, skills, attitudes, and employment policies that is needed to determine the causal forces behind any observed relations.

Geographic Variation in Youth Employment and Joblessness

The effect of some of the proposed explanatory factors on the youth labor market can be analyzed with information on the work activity of youths across SMSA's using data from the U.S. Census of Population of 1970. The Census has sufficiently large samples to provide information on the activity of youths by age, sex, and enrollment status in 125 SMSA's. More limited information on certain explanatory factors reduces the sample to 114 SMSA's.

The state of the youth labor market in each SMSA is measured by three related variables: the ratio of youth employment to the youth civilian population, which reflects the overall impact of supply and demand forces on the amount of work from the group; the labor force participation rate of the young; and the rate of unemployment among the young. The employment to population ratio is given the greatest stress, as it is the clearest measure of objective behavior. The high mobility of young persons into and out of the work force (see Clark and Summers) and the possibility of significant encouraged-discouraged worker behavior makes the labor force and unemployment measures of activity looser and subject to greater potential error.

The analysis differentiates between males and females and among three age groups, 16-17 year olds, most of whom are in school, 18-19 year olds; and 20-24 year olds. Because of significant differences in work activity by school status, calculations relating to the total youth group always contain a variable for the fraction of the group enrolled in school. In addition separate calculations are made for young persons out of and in school.

The three measures of youth labor market activity show considerable differences in employment and joblessness across SMSA's, providing the variation that is a prerequisite for fruitful analysis. As can be seen in line 1 of Table 1, the standard deviation of the employment to population ratio across SMSA's for all young men range from .069 for 16-17 year olds to .059 for 20-24 year olds. The standard deviations of labor participation rates are similar while those for unemployment are lower, but with lower means.

Data on the explanatory factors were obtained from the Census of Population of 1970, from the U.S. Statistical Abstract, which contains a special section on SMSA's, and from other sources, as described in the data appendix.

Differences in the relative supply of young persons are measured by the ratio of the number of young civilians in a specified age-sex group to the number of civilian men 16 and over. Sizeable differences in the distribution of young workers by age among industries and occupations suggests the value of separate analysis for each age-sex group.[4] The ratio of young persons to men 16 and over varies considerably across areas, in part because of differing fertility, mortality and migration patterns and in part, it should be noted, because the Census enumerates college students at their area of residence during college.[5]

Differences in demand for young workers due to differences in the overall level of economic activity across SMSA's are measured by the unemployment rate of 30-34 year old men, and by the rate of growth of total personal income.

To take into account the likely impact of an SMSA's industrial mix on the demand for young workers, a fixed weight index of the favorableness of each SMSA's industrial composition to youth employment was estimated, using national figures on youth employment in industries. Specifically, let α_i = ratio of the number of young persons in a specified age-sex group working in industry i to total employment in industry i in the U.S. as a whole; let W_{ij} = share of employment in SMSA j accounted by industry i and let α = ratio of the number of young persons in the age-sex group employed in the U.S. to total employment. Then the index of industrial mix is defined by:

$$(4) \quad I_j = \sum_i (\alpha_i/\alpha)W_{ij}$$

where α is used as a scaling factor.

The market imperfection most likely to affect demand, the federal minimum does not, of course vary across areas. Since the minimum might be expected to have a bigger impact on low wage than high wage SMSA's, average hourly earnings in an area can be used as a crude proxy measure of the effect of the minimum: the higher the earnings, the less effective the minimum should be. Since earnings measure other characteristics of an area, however, this provides at most a weak test of the effect of the minimum. State minimum wages do of course differ across areas but have low levels and are weakly enforced. A 0-1 dummy variable for the presence of a state minimum is entered in the calculations.

In the SMSA data set it is difficult to measure more complex determinants of youth labor market problems, such as lack of skills, motivation, aspirations, and the like. Current governmental survey data contains little information on the activities of those most likely to be affected by these factors, the out-of-school out-of-the-labor-force young persons. At best, one can include measures of some area characteristics which may be associated with these factors. The following measures are examined: the proportion of one parent/female headed homes in the area; the fraction of homes in the SMSA that are below the official poverty line; the fraction of young persons in the SMSA who are black; and the number of AFDC recipients per person in the SMSA. The fraction of homes in poverty turns out to be the most important of this set of variables. Unfortunately, there are two possible interpretations which can be placed on its effect: it could be an indicator of inadequate demand in the area in which the individual resides or alternatively, it could reflect inadequate work skills and "human capital" formation in disadvantaged homes. Because of this dual interpretation and because both poverty and youth unemployment may be simultaneously determined by other area characteristics, the variable is deleted from some calculations.

Since the welfare, one-parent female, poverty, and black variables measure area characteristics, interpretation of their coefficients in regressions is subject to the 'ecological correlation' problem referred to earlier. The variables provide information on the incidence of youth joblessness across SMSA's with different characteristics, not necessarily about the incidence among persons.

Empirical Analysis: Young Men, 16-24

The effect of the explanatory variables described above on the employment to population rate, labor force participation rate and rate of unemployment of young workers is examined with ordinary least squares (OLS) regressions of the following form:

(5) $$Y_i = \Sigma a_i X_i + U_i$$

where Y_i = the relevant measure of labor force activity

X_i = explanatory variable

U_i = residual

The calculations use a linear form despite the fact that the dependent variables are ratios ranging from 0 to 1. Experiments with the variables in log odds ratio form yielded sufficiently similar results to those from the linear form to make the latter, which is easier to interpret directly, more desirable.

Table 1 contains the basic regression results for young men aged 16-17, 18-19, and 20-24. The regressions include controls for region and size of SMSA (measured by number of persons), as well as the explanatory factors described earlier. Regional dummies are included to control for potential omitted factors that vary among major regions and lead to different labor market conditions for youth. Size of SMSA is included to evaluate the possible concentration of youth joblessness in the larger areas. The figures in the odd columns show the results of regressions which exclude the fraction of homes below the poverty level while the figures in the even columns show results with that variable included as an explanatory factor.

The calculations accord a substantial role to the supply and demand forces under study. In the odd column equations, the relative number of young persons obtains a substantial impact on the employment-to-population rate and on the labor force participation rate of 16-17 and 18-19 year olds and on the unemployment rate of 16-17 year olds though not on the position of 20-24 year olds nor on the unemployment rate of 18-19 year olds. One explanation for the differential effect by age is that the wages of the younger groups have less room for downward adjustment to supply increases than the wages of the older group because the teenage wages are closer to legislated minima.[6] The even numbered equations, which include the percent families below the poverty line as an explanatory factor show reduced effects for the demographic variable amongst teenagers, particularly 16-17 year olds.

The two measures of the level of economic activity in an SMSA, the rate of unemployment of prime age (30-34 year old) men and the rate of growth of total personal income in an area, have powerful effects on the position of young workers in nearly all of the equations. The prime age male unemployment rate significantly reduces the employment ratio and labor force participation rate in all three age groups and raises the unemployment rates of 18-19 and 20-24 year olds though not the unemployment rate of 16-17 year olds, for whom the reduction in participation is especially large. The rate of growth variable is also accorded generally significant non-negligible coefficients, which suggest that growing areas tend to have more jobs for the young than declining areas. The measure of the favorableness of industry mix to youth employment also turns out to be a major determinant of the position of the young. The index is strongly positively related to the employment rate and participation rate. By contrast, the log of average hourly earnings in manufacturing and the dichotomous dummy variable for presence of a state minimum did not noticeably affect the various indicators of the labor market.

Two of the measures of social characteristics used in the calculations have substantial impacts on the employment, labor participation, and unemployment rates. When the fraction of families below the poverty level is excluded as an explanatory variable, the fraction of homes headed by women has a significant depressent effect on youth labor market activity (odd

Table 1: Regression Coefficients and Standard Errors for the Effect of Explanatory Factors on the Labor Market Position of Young Men, 1970

	Employment Ratio						Labor Force Participation Rate						Unemployment Rate					
	16-17		18-19		20-24		16-17		18-19		20-24		16-17		18-19		20-24	
Means and Standard Deviations	.323		.527		.743		.369		.587		.797		.125		.102		.068	
	(.069)		(.065)		(.059)		(.072)		(.067)		(.055)		(.024)		(.036)		(.028)	
Variables																		
Relative Number of Young People	-2.52	-.82	-1.51	-1.36	-.07	-.09	-2.16	-.26	-1.73	-1.60	-.31	-.33	1.78	1.52	-.12	-.19	-.29	-.29
	(.77)	(.73)	(.62)	(59)	(25)	(.24)	(.83)	(.80)	(.64)	(.62)	(.25)	(.24)	(.43)	(.47)	(.38)	(.38)	(.11)	(.11)
Prime Age Male Unemployment Rate	-1.50	-1.01	-1.28	-1.06	-2.01	-1.88	-1.59	-1.04	-.57	-.38	-.65	-.55	.28	.20	1.21	1.11	1.70	1.66
	(.55)	(.50)	(.47)	(.45)	(.37)	(.35)	(.60)	(.53)	(.48)	(.47)	(.36)	(.35)	(.31)	(.31)	(.29)	(.28)	(.16)	(.16)
% Annual Growth Personal Income(x100)	.62	.23	1.01	.77	.40	.25	.62	.18	.88	.68	.35	.23	-.20	-.14	-.37	-.26	-.11	-.07
	(.37)	(.34)	(.32)	(.31)	(.25)	(.24)	(.40)	(.36)	(.33)	(.32)	(.24)	(.24)	(.21)	(.21)	(.20)	(.20)	(.11)	(.11)
Index of Industrial Mix	.21	.14	.42	.39	.26	.27	.26	.18	.41	.39	.25	.26	.03	.04	-.07	-.06	-.03	-.04
	(.09)	(.08)	(.12)	(.12)	(.12)	(.11)	(.09)	(.08)	(.13)	(.12)	(.12)	(.11)	(.05)	(.05)	(.08)	(.07)	(.05)	(.05)
% Homes Headed by Females(x100)	-1.81	-.42	-1.43	-.53	-.82	-.07	-1.73	-.18	-1.17	-.41	-.65	-.06	.68	.46	.67	.27	.26	.02
	(.51)	(.52)	(.41)	(.47)	(.31)	(.37)	(.55)	(.56)	(.42)	(.49)	(.30)	(.37)	(.29)	(.33)	(.25)	(.30)	(.14)	(.17)
% Families Below Low Income Level(x100)	—	-1.61	—	-.84	—	-.65	—	-1.80	—	-.71	—	-.50	—	.24	—	.37	—	.21
		(.30)		(.24)		(.20)		(.32)		(.25)		(.19)		(.19)		(.15)		(.09)
Additional Controls																		
Log Average Hourly Earnings in Manufacturing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AFDC Recipients/Population	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dummy for State Minimum Wage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Log of City Size	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Percent Black	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Percent in School	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Region Dummies	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Intercept	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Summary Statistics																		
R^2	.71	.78	.77	.80	.82	.84	.69	.77	.76	.78	.80	.82	.62	.63	.71	.72	.85	.86

Source: See Data Appendix

equations). When the fraction of families below the poverty level is included it dominates the calculations, reducing the fraction of homes headed by women to insignificance. If the fraction of families below the poverty level is viewed as a measure of family background, and thus of "supply" factors, the equations accord supply a major role in the youth market. Alternatively, if the variable reflects demand conditions in the SMSA not captured by other variables, the equations accord demand factors a bigger role. The AFDC recipients/population variable and, surprisingly, percentage black had, by contrast, no discernible impact on the dependent variables. Because these are measures of area characteristics rather than measures of individual characteristics, however, it should not be concluded that those from welfare homes or blacks are not especially hard hit by joblessness.

As for the remaining variables in the analysis, the size of city has little impact on the calculations, the percentage in school reduces labor market activity noticeably, while the coefficients on the regional dummy variables indicate that the young tend to do better in the Midwest and New England and relatively worse in the Pacific, the South, and the North Atlantic.

It should be emphasized that in many of the calculations in Table 1, explanatory variables have a stronger impact on employment to population rates than on unemployment rates. For example, the relative number of young persons significantly reduces the employment ratio of 18-19 year olds but has no effect on their rate of unemployment, while the prime age male unemployment rate, the percent annual growth of personal income, and the index of industrial mix have larger impacts on employment ratios than on unemployment rates. The reason for this pattern is that variables which alter employment rates have comparable, sometimes larger and sometimes smaller, effects on participation rates due to 'encouraged' or 'discouraged' worker behavior and thus uncertain effects on unemployment. The tendency for explanatory factors to affect employment and participation in the same way and mute their impact on unemployment raises serious doubts about the emphasis usually placed on unemployment as the key indicator of the youth market and as the main dependent variable with which to study the market effects of diverse supply and demand forces.

Labor Market Position, by Enrollment Status

Thus far the analysis has used a single variable, the fraction of young persons in school, to differentiate between the behavior of persons enrolled in school and persons not enrolled in school. This assumes that the major difference between the two groups lies in the level of labor force activity rather than in the effect of explanatory factors. As the response of young persons to conditions may differ depending on enrollment status and as lack of work is presumably a more serious problem for those out of school, it is important to examine the determinants of the employment/population, labor force participation, and unemployment rates for the two groups separately. Accordingly, Table 2 presents regressions in which the dependent variables relate solely to either out of school or in school youth. The independent variables are identical to those used in Table 1, except that the percent of youth in school is deleted as an explanatory factor.

While selected coefficients differ, the results for the out of school and in school youth are qualitatively similar, suggesting roughly comparable market processes at work. The ratio of young men to all men obtains negative coefficients on the employment and participation rates of all groups save 18-19 year olds out of school. As a set, the demand side variables obtain generally comparable regression coefficients, though

Table 2: Regression Coefficients and Standard Errors for the Effect of Explanatory Factors on the Labor Market Position of Out-of-School and In-School Young Men, 1970

	OUT-OF-SCHOOL									IN-SCHOOL								
	Employment Ratio			Labor Force Participation Rate			Unemployment Rate			Employment Ratio			Labor Force Participation Rate			Unemployment Rate		
	16-17	18-19	20-24	16-17	18-19	20-24	16-17	18-19	20-24	16-17	18-19	20-24	16-17	18-19	20-24	16-17	18-19	20-24
Means and Standard Deviations	.438 (.094)	.700 (.074)	.830 (.051)	.555 (.092)	.804 (.054)	.895 (.034)	.214 (.070)	.131 (.053)	.073 (.032)	.310 (.071)	.429 (.074)	.532 (.083)	.347 (.075)	.464 (.079)	.559 (.087)	.115 (.034)	.087 (.030)	.055 (.022)
Variables																		
Relative Number of Young People	-1.92 (1.45)	.88 (.57)	-.32 (.16)	-.58 (1.55)	.87 (.57)	-.38 (.13)	2.81 (1.06)	-.17 (.45)	-.05 (.09)	-.95 (.70)	-2.80 (.63)	-1.34 (.40)	-.48 (.76)	-2.77 (.68)	-1.33 (.41)	1.45 (.44)	.36 (.28)	.07 (.07)
Prime Age Male Unemployment Rate	-2.23 (1.00)	-1.99 (.57)	-2.22 (.35)	-1.42 (1.07)	-.69 (.47)	-.62 (.29)	1.88 (.73)	1.66 (.42)	1.81 (.20)	-.93 (.46)	-.45 (.58)	-1.35 (.88)	-1.04 (.52)	-.14 (.63)	-.74 (.91)	.05 (.31)	.79 (.26)	1.35 (.17)
% Annual Growth Personal Income (x100)	-.22 (.67)	.01 (.39)	.12 (.24)	.18 (.72)	-.18 (.32)	-.01 (.20)	.84 (.49)	-.21 (.29)	-.16 (.13)	.37 (.33)	1.41 (.40)	1.37 (.60)	.26 (.35)	1.29 (.43)	1.36 (.62)	-.29 (.20)	-.39 (.18)	-.16 (.11)
Index of Industrial Mix	.32 (.16)	.54 (.14)	.33 (.11)	.35 (.17)	.48 (.12)	.27 (.09)	-.05 (.12)	-.12 (.11)	-.09 (.06)	.14 (.08)	.30 (.15)	.26 (.28)	.17 (.08)	.29 (.16)	.26 (.29)	.04 (.05)	-.07 (.07)	-.06 (.05)
% Homes Headed by Females(x100)	-2.00 (1.06)	-.84 (.60)	.01 (.36)	-1.71 (1.13)	-.57 (.49)	.00 (.31)	.36 (.77)	.36 (.44)	.00 (.21)	-.25 (.51)	-.41 (.61)	.07 (.93)	-.02 (.55)	-.35 (.66)	-.04 (.96)	.47 (.32)	.29 (.27)	-.12 (.17)
% Families Below Low Income Level	-.36 (.58)	-.92 (.30)	.52 (.19)	-.60 (.62)	-.70 (.25)	-.39 (.16)	.07 (.42)	.42 (.22)	.17 (.11)	-1.66 (.28)	-.71 (.32)	-.72 (.49)	-1.85 (.30)	-.70 (.34)	-.67 (.51)	.23 (.18)	.26 (.14)	.17 (.09)
Additional Controls																		
Log Average Hourly Earnings in Manufac.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
AFDC Recipients/Pop.	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Dummy for State Min. Wage	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Log of City Size	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Percent Black	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Percent in School	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Region Dummies	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
Intercept	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Summary Statistics																		
R^2	.48	.74	.78	.39	.66	.65	.50	.72	.84	.79	.72	.46	.79	.71	.48	.63	.65	.74

particular variables have different impacts: the rate of unemployment of men 30-34 has a somewhat larger effect on out of school than in school young men while the growth of personal income has a larger effect on the in school group. The family and related social characteristics variables also tell much the same story for both groups of young men.

To what extent is the division of the youth population between in school and out of school also affected by the demand and supply variables under study?

Because the Census enumerates college students by their place of college residence(whose labor market conditions presumably do not influence enrollment decisions),this important question can be analyzed with existing Census data only for 16-17 year olds who are unlikely to be in college as yet. For that group, the labor market variables obtain reasonable coefficients: the relative number of young persons and average hourly earnings in the area raise the proportion in school while the rate of growth of personal income, the industry mix, and the fraction of female headed homes or with incomes below the poverty line reduce the proportion in school:[7]

Estimated Effect of Variables on Percent in School, 16-17 Year Olds

	Coefficient	Standard Error
Relative number of young	1.25	.40
Average hourly earnings	.04	.02
Growth of personal income	-.37	.19
Industry mix	-.08	.04
Percent with Incomes below poverty line	-.56	.02

These results suggest that the fraction of young persons who drop out of school rises when the labor market is stronger. For 18-19 and 20-24 year olds, comparable regressions tell a similar story, with even larger coefficients on the labor market variables but, as noted, with less clear causal connections. We conclude that the same factors that influence the labor market for youths as a whole have roughly comparable effects on those out of school and those in school, which implies that inferences based on the entire youth population are reasonably likely to hold for either subgroup, and may also possibly affect the division between the two groups.[8]

The Impact of Supply and Demand Factors

In terms of our initial analysis of youth joblessness as reflecting differing supply and demand schedules (coupled with sluggish wage adjustments), to what extent are the observed differences in youth joblessness across SMSA's attributable to supply factors or to demand factors?

To answer this question I have calculated the incremental R^2 when supply or demand factors are added to regressions that include the other relevant variables and have also calculated standardized regression coefficients, which show how much change in dependent variables is associated with standard deviation changes in explanatory factors. Because of the significance of the percent of families below the poverty line in the analysis and the problems of interpretation noted earlier, calculations are made with that variable included and excluded from the analysis. Table 3 presents the results. The columns labelled (a) are based on calculations which exclude the percent of families below the poverty line from the analysis, while those labelled (b) include that variable either as part of the supply set or as a control variable in the calculations. In the (a) calculations supply factors tend to be more important than demand factors for 16-17 year olds, about equally as important as demand for 18-19 year olds and less important for 20-24 year olds. In the (b) calculations, the percent of families below the poverty line dominates the regressions for the younger

Table 3: Differential Effect of Supply and Demand Forces on Youth Employment and Unemployment

Measure of Impact	EMPLOYMENT RATE						UNEMPLOYMENT RATE					
	16-17 Year olds		18-19 Year olds		20-24 Year olds		16-17 Year olds		18-19 Year olds		20-24 Year olds	
	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)	(a)	(b)
Incremental R^2												
Demand Variables	.05	.02	.07	.04	.07	.06	.01	.01	.08	.06	.19	.17
Supply Variables	.19	.01	.06	.02	.02	.04	.15	.05	.04	.00	.02	.01
Percent Below Poverty Line		.24		.07		.77		.11		.05		.02
Effect of One Standard Deviation Change												
Demand (sum of variables)	.52	.32	.67	.56	.61	.55	-.11	-.05	-.56	-.49	-.71	-.68
Prime age male unemployment rate	(.22)	(.15)	(.20)	(.16)	(.35)	(.32)	(-.08)	(-.06)	(-.34)	(-.32)	(-.61)	(-.60)
Percent growth personal income	(.13)	(.05)	(.23)	(.17)	(.10)	(.06)	(-.09)	(-.06)	(-.15)	(-.11)	(-.06)	(-.03)
Index of industrial mix	(.17)	(.12)	(.24)	(.23)	(.16)	(.17)	(.06)	(.07)	(-.07)	(-.06)	(-.04)	(.05)
Supply (sum of variables)	-.72	(-.19)	-.53	-.23	-.22	.00	.54	.37	.28	.07	-.04	-.20
Relative no. of young people	(-.23)	(-.08)	-.19	(-.17)	(-.02)	(-.03)	(.33)	(.29)	(-.03)	(-.04)	(-.19)	(-.18)
AFDC recipients/popl.	(.00)	(.10)	(.05)	(.11)	(.07)	(.13)	(.02)	(-.02)	(.00)	(-.04)	(-.06)	(-.11)
Percent female headed homes	(-.47)	(-.11)	(-.39)	(-.14)	(-.25)	(-.02)	(.36)	(.24)	(.33)	(.13)	(.16)	(.03)
Percent black	(-.02)	(-.10)	(.01)	(-.03)	(.02)	(-.08)	(-.17)	(-.14)	(-.02)	(.02)	(.05)	(.03)
Percent below poverty line		-.86		-.47		-.41		.27		.39		.23

Source: Calculated from regressions, as in table 1, with percent below poverty line excluded from column a and included in column b regressions. All calculations include control variables used in table 1 but not listed as reflecting demand or supply factors - i.e. region dummies.

age groups, so that its inclusion as a demand or supply variable is critical in determining the relative importance of the two sets of forces. Even with the percent below poverty variable, however, demand factors continue to be the dominant factor for 20-24 year olds and remain more important than supply factors for 18-19 year olds as well. Perhaps the safest conclusion to reach is that supply or background factors are relatively more important determinants of the position of teenagers while demand factors are more important for those in their early twenties.

Work Activity of Young Women

To see whether the labor market position of young women is influenced by the same factors that determine the position of young men, the employment to population rate, labor participation rate, and rate of unemployment of women aged 16-17, 18-19, and 20-24 are regressed on essentially the same variables as in tables 1 and 2, with two exceptions: the relative number of young persons is measured by the ratio of the number of young women in each group (rather than the number of young men) to the number of civilian men 16 and over, and the index of industrial mix is based on the ratio of young women to all workers in the industry in the U.S. (rather than by the ratio of young men to all workers). Table 4 summarizes the results of the regressions for young women in terms of the OLS coefficients and standard errors of the major variables and the summary statistics and presents comparable information from the regressions for young men.

The regression results reveal considerable similarities between the sexes in the labor market effects of most variables. The relative number of young persons is an exception: it does not reduce the employment to population rate and labor participation ratio of 16-17 and 18-19 year old women with the same significance and magnitude as it does for 16-17 and 18-19 year old men. In contrast, the prime age male unemployment rate

Table 4: Comparison of the Effects of Major Economic Variables on the Economic Position of Young Men and Women

	Employment Ratio		Labor Force Participation Rate		Unemployment Rate	
	Male	Female	Male	Female	Male	Female
16-17						
Relative Number of Young People	-.82	-.17	-.26	-.07	1.52	.26
	(.75)	(.79)	(.80)	(.85)	(.47)	(.58)
Prime Age Male Unemployment Rate	-1.01	-1.38	-1.04	-1.32	.20	.74
	(.50)	(.53)	(.53)	(.57)	(.31)	(.39)
Percent Growth of Personal Income	.23	.37	.18	.35	-.14	-.24
	(.34)	(.36)	(.36)	(.39)	(.21)	(.26)
Index of Industrial Mix	.14	.14	.18	.17	.04	.01
	(.08)	(.06)	(.08)	(.07)	(.05)	(.05)
Percent of Female Headed Households	-.42	-.10	-.18	-.07	.46	-.14
	(.52)	(.57)	(.56)	(.62)	(.33)	(.42)
Percent families Below Low-Income Level	-1.61	-1.30	-1.80	-1.43	.24	.96
	(.30)	(.33)	(.32)	(.35)	(.19)	(.24)
R^2	.78	.78	.77	.77	.63	.70
18-19						
Relative Number of Young People	-1.36	-.70	-1.60	-1.18	-.19	-.64
	(.59)	(.64)	(.62)	(.65)	(.38)	(.40)
Prime Age Male Unemployment Rate	-1.06	-.88	-.38	-.34	1.11	1.04
	(.45)	(.50)	(.47)	(.51)	(.28)	(.31)
Percent Growth of Personal Income	.77	.54	.68	.42	-.26	-.39
	(.31)	(.34)	(.32)	(.34)	(.20)	(.21)
Index of Industrial Mix	.38	.26	.39	.22	-.06	-.12
	(.12)	(.11)	(.12)	(.11)	(.07)	(.07)
Percent of Female Headed Households	-.53	.35	-.41	.52	-.07	-.16
	(.47)	(.54)	(.49)	(.54)	(.15)	(.17)
Percent Families Below Low-Income Level	-.84	-1.62	-.71	-1.51	.27	.02
	(.24)	(.28)	(.25)	(.28)	(.30)	(.34)
R^2	.80	.81	.78	.79	.72	.76
20-24						
Relative Number of Young People	-.09	.16	-.33	.19	-.29	.05
	(.24)	(.21)	(.24)	(.19)	(.11)	(.09)
Prime Age Male Unemployment Rate	-1.88	-1.10	-.55	-.74	1.66	.70
	(.35)	(.42)	(.35)	(.39)	(.16)	(.18)
Percent Growth of Personal Income	.25	.27	.23	.15	-.07	-.24
	(.24)	(.29)	(.24)	(.27)	(.11)	(.12)
Index of Industrial Mix	.27	.29	.26	.17	.04	-.21
	(.11)	(.14)	(.11)	(.13)	(.05)	(.06)
Percent Female Headed Households	-.07	.86	-.06	.93	.02	.00
	(.37)	(.45)	(.37)	(.42)	(.17)	(.20)
Percent Families Below Low-Income Level	-.65	-1.55	-.50	-1.52	.21	.28
	(.20)	(.23)	(.19)	(.22)	(.09)	(.10)
R^2	.84	.77	.82	.74	.86	.77

has as sizeable impacts on the employment/population, labor force participation and unemployment rate of women as on those for men. The growth of personal income, the index of industrial mix, and the fraction of families below low-income level also have roughly comparable effects. The fraction of one parent/female homes has a somewhat smaller effect on the employment of 16-17 year old women than on 16-17 year old men. But has comparable effects in the other age groups.

Although there are differences, the overall impression from the table is that similar area factors are associated with geographic variation in the employment of young women as of young men.

Relevance to Changes Over Time

The question naturally arises as to the relevance of the cross-sectional calculations to observed changes in youth labor force activity over time. Are the estimated effects of variables in the cross-section consistent with comparable estimates from time series data? Do the estimates help explain observed trends in the youth labor market?

To compare the effect of variables in cross-section and time series data, it is best to estimate their coefficients with identical controls. Since the time series has fewer observations and less information about some variables, a relatively simple set of comparable regressions was estimated for the SMSA data set and the time series. The employment to population rate, labor force participation rate, and rate of unemployment of young male workers 16-17, 18-19, and 20-24 was regressed on three explanatory variables: the rate of male unemployment; the ratio of the number of young men in each age group relative to the number of men 16 and over; and measures of the minimum wage, ln average earnings in private industry in the cross-section data and ln of the federal minimum divided by average earnings in private industry in the time series. The cross-section data are taken from the basic SMSA data set. The sources of the time series data are described in the data appendix. Because of the danger of mistaking similar trends in time series variables for causal relations, the time series regressions are estimated in two different specifications: without a time trend variable and with a trend variable included.

Table 5 presents the estimated coefficients from the time series and cross-SMSA regressions. While there are some differences in the estimated effect of variables, the general pattern is of broad similarity in the regression coefficients. The relative number of young persons has a roughly similar qualitative impact on employment to population and labor participation and unemployment rates in the two sets of calculations. Note however that the magnitude of the estimated coefficients in time series regressions is quite sensitive to inclusion or exclusion of trend, a pattern that highlights the problem of inferring the effect of demographic factors from the time series data. The unemployment rate of men reduces the employment to population rato and raises the unemployment rate of all groups by similar magnitudes and has comparable effects on the labor force participation of 16-17 year olds (though not on those of 18-19 and 20-24 year olds), The third explanatory factor, the minimum wage variable is negative, of comparable magnitude in the regressions for 16-17 and 18-19 year olds, where it obtains significant effects on the employment to population and labor force participation rates but has no discernible impact on the unemployment rate. The minimum wage variable is, on the other hand, accorded different effects on the 20-24 year olds in the cross-section and time series. Overall, however, the coefficients from the two sets of regressions are roughly consistent, enhancing the believability of each.

Table 5: Comparison of the Estimated Effect of Selected Variables on Youth Work Activity, 1948-77 Time Series Regressions vs. Cross-SMSA Regressions

	16-17 year olds			18-19 year olds			20-24 year olds		
Variable	cross-SMSA	time series		cross-SMSA	time series		cross-SMSA	time series	
				A) Employment to Population Rate					
Total unemployment rate	-2.25	-2.05	-2.44	-2.28	-1.94	-1.72	-3.41	-1.49	-1.51
	(.60)	(.36)	(.36)	(.52)	(.51)	(.54)	(.42)	(.32)	(.25)
Rel. no. of young persons	-3.57	-3.33	-6.09	-3.38	-3.18	-1.27	-1.66	-.94	-.20
	(.83)	(.48)	(1.12)	(.58)	(.64)	(1.83)	(.21)	(.20)	(.24)
"Minimum wage" proxy	-.12	-.09	-.11	-.15	-.14	-.10	- .11	-.01	.06
	(.04)	(.03)	(.03)	(.04)	(.04)	(.05)	(.03)	(.03)	(.03)
Time trend	--	--	.26	--	--	-.18	--	--	-.19
			(.10)			(.17)			(.05)
R^2	(.25)	.75	.80	.33	.60	.62	.49	.65	.79
				B) Labor Force Participation Rate					
Total unemployment rate	-2.03	-1.07	-1.69	-1.08	.13	.21	-1.70	.56	.55
	(.63)	(.46)	(.41)	(.53)	(.51)	(.55)	(.41)	(.24)	(.22)
Rel. no. of young persons	-3.10	-1.78	-6.19	-3.43	-2.18	-1.45	-1.72	-.61	-.15
	(.89)	(.60)	(1.28)	(.59)	(.64)	(1.85)	(.21)	(.15)	(.20)
"Minimum wage" proxy	-.15	-.09	-.12	-.18	-.13	-.12	-.12	.00	.04
	(.05)	(.04)	(.03)	(.04)	(.04)	(.05)	(.03)	(.02)	(.02)
Time trend	--	--	.41	--	--	-.07	--	--	-.11
			(.11)			(.17)			(.04)
R^2	.21	.42	.63	.33	.44	.44	.42	.49	.62
				C) Unemployment Rate					
Male unemployment rate	1.24	2.32	2.07	2.20	2.90	2.70	2.28	2.34	2.35
	(.26)	(.18)	(.16)	(.26)	(.19)	(.18)	(.15)	(.16)	(.12)
Rel. no. of young persons	2.41	3.65	1.88	.48	1.72	-.05	.06	.45	.08
	(.37)	(.24)	(.49)	(.29)	(.24)	(.60)	(.08)	(.10)	(.12)
"Minimum wage" proxy	-.03	.02	.01	-.02	.03	.00	.00	.01	-.02
	(.02)	(.01)	(.01)	(.02)	(.02)	(.02)	(.01)	(.01)	(.01)
Time trend	--	--	.17	--	--	.17	--	--	.09
			(.04)			(.04)			(.02)
R^2	.41	.93	.96	.44	.90	.93	.70	.90	.94

[1] The minimum wage variable in the cross-SMSA data set is the ln of the inverse of average hourly earnings in the area. The minimum wage variable in the time series data set is the ln of the ratio of the federal minimum to average hourly earnings.

Source: Cross-SMSA figures based on regressions using 114 SMSA data set. Time series figures based on data described in data appendix.

While the cross-section and time series regressions yield roughly similar estimates, it is important to note that neither analysis explains developments in the youth labor market in the 1970s. As Table 6 shows, from 1969 to 1977 the employment/population ratio of 16-17 year olds changed modestly while their labor force participation and unemployment rates rose. There was a marked divergence from 1969 to 1977 between actual changes in youth work activity and the changes predicted by either the cross-section or time series models. Because the adult male unemployment rate increased sharply while the relative number of young persons either changed only slightly (teenagers) or increased (20-24 year old workers), dwarfing the effects of a decline in the ratio of the minimum wage to the average wage, the cross section and time series regressions predict a marked decline in the employment/population and labor participation rates, and a sizeable increase in unemployment rates. In fact, employment/population ratios changed unevenly while labor participation rates rose sharply so that only the unemployment rates followed the predicted pattern. Despite concern over the inability of the labor market to generate jobs for youth, youth work activity did not decline or decreased only slightly in the 1970s, despite adverse cyclical and other developments, for reasons that are unclear. While our time series and cross-section regressions yield comparable results, neither adequately tracks the performance of the youth market in the 1970s.[9]

Individual Variation

The analysis thus far has treated area data which, while well-suited for investigating the effects of broad market factors in the position of youth, provides only weak information on individual differences in youth participation or unemployment. To obtain a better understanding of the incidence of youth labor market problems among individuals and of the social characteristics of the individuals lacking employment, it is necessary to obtain data on individuals rather than on SMSA's.

Table 6: Predicted and Actual Changes in Youth Work Activity, 1969-1977

	Actual Value		Actual Change	Predicted Changes, 1969-1977		
	1969	1977	1969-1977	Using cross-section model	Using time-series model without trend	Using time-series model with trend
Explanatory Factor						
Rate of Unemployment of Adult Men	.015	.035	.020			
Relative No. of Young Persons						
16-17 year olds	.059	.057	-.002			
18-19 year olds	.051	.053	.002			
20-24 year olds	.101	.124	.023			
Ln(Minimum Wage/Average Wage)	-.734	-.821	-.087			
Trend	22	30	8			
Dependent Variables						
Employment/Population						
16-17 year olds	40.8	40.5	-.3	-2.7	-2.5	-0.4
18-19 year olds	59.7	61.2	1.5	-3.9	-3.7	-4.5
20-24 year olds	78.6	76.5	-2.1	-9.7	-5.1	-5.4
Labor Force Participation Rate						
16-17 year olds	47.3	50.3	3.0	-2.1	-0.9	2.4
18-19 year olds	65.9	72.5	6.6	-1.3	0.7	0.4
20-24 year olds	82.8	85.7	2.9	-6.3	-0.3	-0.4
Unemployment Rate						
16-17 year olds	13.8	19.5	5.7	2.3	3.6	4.9
18-19 year olds	9.4	15.6	6.2	4.7	6.0	6.8
20-24 year olds	5.1	10.7	5.6	4.7	5.6	5.8

The Survey of Income and Education, conducted in the spring of 1976, provides an especially valuable sample for such an investigation. The survey contains about 3 times as many respondents on the standard Current Population Survey monthly samples and a variety of information on family background that is unavailable in most CPS months. Of particular importance, the SIE has data on wages and hours worked over a year, as well as on employment status, which permits comparison of the effect of variables on rates of pay as opposed to the amount of work activity.

The SIE data are examined in two stages. First, a linear probability model is fit linking dichotomous dummy variables for employment and for unemployment in Spring 1976 to various characteristics of the individual and his or her family. Since the linear model is additive, the effect of variables on the probability of labor force participation can be obtained by adding the coefficients on employment and unemployment. While the linear model is not entirely appropriate for analysis of 0-1 variables, the advantage of a more complex curvilinear form, such as the logistic, is likely to be modest. Second, ln earnings equations are estimated linking hourly and annual earnings in 1975 to the same set of measures of individual characteristics. The earnings equations provide information on the wage side of the youth labor market. Comparison of the effect of variables on hourly earnings and on the probability of employment or annual earnings (which depends critically on the probability of employment over the year) can cast considerable light on the extent to which youth labor market problems are associated with joblessness as opposed to, or in conjunction with, low rates of pay.

The analyses examine the impact of the following characteristics of individuals or their families:

-race, measured by a dichotomous variable (=1 when the individual is black);

-receipt of welfare by the household of residence, a dichotomous variable which takes the value 1 if the family obtained welfare in 1975;

-receipt of food stamps, a dichotomous variable which takes the value 1 if the family obtained food stamps in 1975;

-residence in public housing, a dichotomous variable which takes the value of 1 if the family was living in public housing when surveyed;

-residence in a one parent/female home, a dichotomous variable which takes the value 1 if the individual's parental family contained a female head of household;

-years of education;

-school activity status, a dichotomous variable which takes the value 1 if the person's major activity at the time of the survey was being in school;

-other family income, a continuous measure of total family income in 1975 minus the individual's earnings in 1975;

-region of residence, consisting of 7 dummy variables for region;

-urban status, a dichotomous variable which takes the value 1 if a person lived in an urban area in 1976;

-family income below the poverty line, a 0-1 variable which takes the value 1 if the family income in 1975 fell below the official poverty line. Since some of the respondents are no longer living with their parents or other adults, the measures of family background do not always relate to the position of the home in which they were brought up: for 16-17 and 18-19 year olds, of whom only 0.6% and 8% reside outside the home of their parent or other adult, the problem is not severe; for 20-24 year olds, of whom about half are themselves heads of households and for many of those out of school, however, the family variables relate to parental homes for a significant fraction and to homes headed by the individual for a significant fraction, which confuses the interpretation. To deal with this problem, a dummy variable for those who are themselves heads of households was included in all of the calculations, and the variable was interacted with other family income. In addition, for 20-24 year olds, separate calculations for those residing in homes headed by others were estimated. The results are sufficiently similar to those reported in the table as to suggest that the head of household dummy variable suffices to deal with the problem.

The calculations yield one striking result: the factors that influence the employment status of young workers are not the same as the factors that influence their wage rates. Being black, for example, lowers the probability of being employed substantively but has little or no effect on wages. In one sense, this result justifies analysis of youth joblessness as a labor market problem distinct from standard analysis of wages. While presumably related, the determinants of employment chances and earnings differ enough as to constitute separate subjects of study.

Evidence for the claim the personal characteristics have very different effects on employment status than on earnings is given in tables 7 and 8. Table 7 summarizes the results of the linear probability estimates of the determinants of the employment and joblessness of all young men aged 16-17, 18-19 and 20-24, and for 18-19 and 20-24 year old men out of school.[10] The first column in each heading records means of the relevant variables while the next two columns give the regression coefficients and standard errors from the linear probability model.

Not surprisingly, the calculations show that black youth, those with fewer years of schooling, and those whose major activity is school turn out to have much lower rates of employment and higher rates of unemployment. The measures of family status -- being in a female headed home, family receipt of welfare or food stamps, and residence in public housing, the income of the household exclusive of the young person himself and whether the family is or is not below the poverty line--also have some effect, with

Table 7: Linear Probability of Estimates of Determinants of the Employment of Young Men, 1976

	All 16-17 year olds			All 18-19 year olds			Out of School[1] 18-19 year olds			All 20-24 year olds			Out of School 18-19 year olds		
Measure of	means	empl.	unemp.	means	empl.	unemp.	means	empl.	unemp.	means	empl.	unemp.	means	empl.	unemp.
Background Status		.47	.11		.63	.11		.75	.15		.74	.09		.81	.10
Individual status															
black	.10	-.20	.06	.09	-.21	.11	.09	-.19	.12	.08	-.12	.05	.08	-.10	.04
		(.02)	(.01)		(.02)	(.01)		(.03)	(.02)		(.01	(.01)		(.01)	(.01)
years of schooling	10.0	.044	-.007	11.6	.02	-.01	11.1	.033	-.02	12.8	.012	-.005	12.2	.014	-.007
		(.005)	(.003)		(.003)	(.002)		(.015)	(.004)		(.001)	(.001)		(.002)	(.001)
major activity is in school	.67	-.20	-.10	.36	-.34	-.08		—	—		-.43	-.05		—	—
		(.01)	(.01)		(.01)	(.01)					(.01)	(.01)			
Family status															
female headed home	.13	-.02	.01	.11	-.05	.02	.12	-.03	.02	.06	-.05	.05	.06	-.05	.05
		(.02)	(.01)		(.02)	(.01)		(.03)	(.02)		(.01)	(.01)		(.01)	(.01)
family receives welfare	.08	-.05	.08	.06	-.02	-.01	.08	-.04	-.00	.04	-.08	.06	.05	-.08	.06
		(.02)	(.01)		(.02)	(.02)		(.03)	(.03)		(.02)	(.01)		(.02)	(.01)
food stamps	.12	-.04	.01	.10	-.07	.07	.14	-.08	.10	.10	-.04	.08	.12	-.06	.07
		(.02)	(.01)		(.02)	(.01)		(.03)	(.02)		(.01)	(.01)		(.01)	(.01)
public housing	.02	-.02	.06	.02	-.12	.09	.02	-.16	.11	.02	-.11	.00	.02	-.12	-.00
		(.04)	(.02)		(.03)	(.02)		(.05)	(.04)		(.02)	(.02)		(.02)	(.02)
other family income(in thousands of $)	$18.305	.047	-.021	17.437	-.001	.003	13.500	.000	-.001	11.973	-.001	.002	9.793	-.001	-.001
		(.025)	(.017)		(.0004)	(.003)		(.001)	(.0007)		(.0003)	(.0007)		(.005)	(.0004)
family below poverty line	.11	-.06	-.02	.11	-.08	.01	.14	-.04	.007	.09	-.08	.03	-.08	-.08	.04
		(.02)	(.01)		(.02)	(.01)		(.02)	(.02)		(.01)	(.01)		(.01)	(.01)
Other Controls															
age		✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓
head of household		✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓
interaction: head of household and other family income		✓	✓		✓	✓	✓	✓	✓		✓	✓		✓	✓
region		8	8		8	8		8	8		8	8		8	8
urban		✓	✓		✓	✓		✓	✓		✓	✓		✓	✓
subsidized rent		✓	✓		✓	✓		✓	✓		✓	✓		✓	✓
Summary Statistics															
R^2		.12	.05		.17	.23		.09	.07		.17	.05		.07	.05
SEE		.47	.31		.44	.31		.42	.35		.40	.29		.38	.29
n		9297	9297		8476	8476		3185	3185		18,395	18,395		12,513	12,513

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[1] The numbers in this column represent a smaller fraction of the youth than the proportion whose major activity is "in school." This is because a stricter definition of schooling is used. Persons out of school are not enrolled at all. Since some persons whose major activity is reported as other than being in school are enrolled, the numbers in the out of school columns represent a smaller fraction of the total than would be obtained from the major activity question.

Source: Survey of Income and Education

a general pattern that those from more disadvantaged backgrounds have lower probabilities of employment and higher probabilities of unemployment than those from more advantaged backgrounds. The most noticeable exception to this generalization is that other family income is accorded little or no impact on employment or unemployment in the bulk of the calculations. Even so, the regressions suggest youth joblessness is concentrated among persons from more disadvantaged homes and, with all other characteristics fixed, among blacks.

The ln hourly earnings in table 8 tell a very different story about the determinant of the wages of the young. First, and perhaps most importantly, being black is not a major depressent of wages. Among 16-17 year olds, being black is actually associated with higher wages while in the other age groups, blacks are estimated to have only a 5 to 6 percent disadvantage. Second, with the exception of the poverty line variable, the measures of family status also fail to evince the negative effects found in the employment and unemployment regressions. Being in school and years of schooling also have much smaller impacts on wage rates than on employment status. Since being below the poverty line is partially determined by wages, particularly for 20-24 year olds, making its strong effect on wages questionable in terms of the direction of causality,[11] the main conclusion is that the background factors which adversely affect employment chances have much diminished or in some cases opposite effects on wage rates.

Since the calculations in table 8 are limited to persons who worked and reported earnings in 1975 while those in table 7 refer to a larger sample which includes those who did not work, it is possible that some of the differential effects are attributable to differences in the samples. To check this possible bias, as well as to expand the analysis to a

Table 8: Regression Coefficient Estimates of the Background Determinants of the Ln of Hourly and Annual Earnings of Young Men, 1975

	16-17 year olds				18-19 year olds				20-24 year olds			
Measure of Background Status	mean	ln hrly earnings	ln annl earnings	implied ln annl hrs wkd	mean	ln hrly earnings	ln annl earnings	implied ln annl hrs wkd	mean	ln hrly earnings	ln annl earnings	implied ln annl hrs wkd
		.53	6.37	5.84		.80	7.36	6.56		1.16	8.29	7.16
black	.07	.14	−.17	−.31	.07	−.06	−.33	−.27	.07	−.05	−.14	−.09
		(.04)	(.06)			(.04)	(.051)			(.02)	(.03)	
years of schooling	10.2	.04	.09	.05	11.7	−.04	−.01	.03	12.8	.007	−.04	−.03
		(.01)	(.02)			(.02)	(.01)			(.002)	(.004)	
major activity is in school	.66	−.01	−.26	−.25	.34	−.05	−.50	−.45	.13	−.08	−.70	−.62
		(.02)	(.03)			(.02)	(.03)			(.01)	(.02)	
female headed home	.13	.08	.01	−.07	.10	.04	−.08	−.12	.06	−.00	−.08	−.08
		(.03)	(.05)			(.03)	(.02)			(.02)	(.03)	
family receives welfare	.07	.05	−.12	−.17	.05	.01	−.14	−.10	.04	−.06	−.22	−.16
		(.05)	(.07)			(.04)	(.06)			(.03)	(.04)	
food stamps	.10	.05	.07	.02	.09	.00	−.09	−.09				
		(.04)	(.06)			(.03)	(.05)					
public housing	.02	.07	.26	.21	.02	.13	.11	−.02	.02	−.04	−.24	−.20
		(.08)	(.12)			(.07)	(.10)			(.04)	(.03)	
other family income (in thousands of $)	$18.994	.003	.002	−.001	17.815	.002	−.002	−.004	11.924	−.003	−.008	−.005
		(.001)	(.001)			(.001)	(.001)			(.005)	(.001)	
family below 1975 poverty line	.08	−.16	−.43	−.27	.09	−.37	−.72	−.25	.07	−.56	−1.25	−.79
		(.04)	(.06)			(.03)	(.05)			(.02)	(.03)	
Other Controls												
-age		✓	✓			✓	✓			✓	✓	
-head of household		✓	✓			✓	✓			✓	✓	
-interaction: head of household and other family income		✓	✓			✓	✓			✓	✓	
-region		8	8			8	8			8	8	
-urban		✓	✓			✓	✓			✓	✓	
-subsidized rent		✓	✓			✓	✓			✓	✓	
Summary Statistic												
R^2		.03	.10	.20		.06				.12	.34	
SEE		.73	1.05	.95		.66				.58	.83	
n		5240	5240			6728	6728			15 430	15 430	

Source: Survey of Income and Education

more continuous measure of time worked, the log of annual earnings was also regressed on the independent variables in the sample reporting earnings. Differences between the impact of variables on log of hourly and log of annual earnings reflect effects on annual hours worked. As can be seen in table 8, these calculations confirm the basic conclusion that rates of pay are largely unaffected or affected differently by the background factors under study than is time worked. Whereas, for example, being black reduces the log of hourly earnings of 18-19 year old blacks by .06 ln points, it reduces the log of annual earnings by .33, implying a .27 reduction in annual hours worked.

The divergent effect of race and background factors on time worked and rates of earnings per hour (or week) highlights an important aspect of the youth labor market: striking differences between its employment and wage dimensions. The disadvantaged groups that bear the brunt of joblessness obtain roughly similar pay to other youngsters upon receipt of employment. While it may be argued that the concentration of youth joblessness among certain groups, whose pay is the same as that of others, could be alleviated by wage differentials (tying the employment and wage findings together), perhaps the safest conclusion to reach is that the labor market problem for the disadvantaged is largely one of generating jobs. Once employed, blacks and other disadvantaged youth have roughly as high earnings as other young persons.

IV Summary of Findings

The results of our analysis of geographic and individual differences in youth employment, unemployment, and earnings can be summarized briefly: First, the employment of young workers across areas depends in a reasonably comprehensible way on demand and supply factors, notably the overall level of economic activity, as reflected in rates of unemployment of prime age men and growth of personal income, the industrial composition of employment, the number of young persons relative to the number of older persons (for teenagers only) and the poverty status of an area. Second, variables that influence employment often have comparable effects on labor participation, leading to smaller or even contrary effects on unemployment. Analyses which focus strictly on unemployment rates may, as a result, be highly misleading. Third, the cross-section calculations, while yielding results consistent with comparable time series regressions, do not provide an explanation of youth labor market developments in the 1970s, when employment to population rates did not fall and participation rates increased in the face of adverse economic changes. Fourth, the correlates of youth joblessness are not the same as the correlates of low wages, with blacks and others from disadvantaged backgrounds having higher incidences of joblessness but obtaining similar wages to other workers.

Footnotes

[1] Between 1967 and 1977 the number of persons aged 16-24 increased by 37% while the population 16 and over increased by 23%, as calculated from U.S. Department of Labor, Employment and Training Report of the President, 1978, table A-2, pp. 181-182.

[2] The SMSA data set is described in the data appendix. For a detailed description of the SIE survey see U.S. Department of Commerce and U.S. Department of Health Education and Welfare, "Assessment of the Accuracy of the Survey of Income and Education" A Report to Congress Moderated by the Education Amendment of 1974 (Jan. 1967).

[3] To solve for the equilibrium set $\Delta(\ln D-\ln S) = 0$.

[4] See R. Freeman and J. Medoff, "The Youth Labor Market Problem: An Overview," table 6, where significant differences in the distribution of the 16-17, 18-19 and 20-24 year olds among industries and occupations are shown.

[5] The coefficients of variation for the ratio of young men to men 16 and over are: 16-17 year olds, .113; 18-19 year olds, .16; 20-24 year olds, .17.

[6] Another possible explanation is that 20-24 year olds migrate to areas with low rates of youth joblessness, which would mute or reverse, any adverse effect of relative numbers on joblessness. By contrast the bulk of teenagers reside with parents who are unlikely to migrate to areas where job opportunities are better for the young.

[7] In these regressions I have included all of the control variables used in Table 1.

[8] Analysis of the in-school and out-of-school youth can be developed further through estimation of the structural supply and demand equations which presumably underly the relations examined in the text. Such an analysis would seek to determine the degree of substitutability between in-school and out-of-school youth in the job market among other things.

[9] For a similar conclusion see Burt Barnow, "Teenage Unemployment and Demographic Factors: A Survey of Recent Evidence" (U.S. Department of Labor, March 21, 1979).

[10] As described in the table note, persons in the out-of-school group are limited to those not enrolled in school and do not include enrolled persons who report their major activity as being other than in school.

[11] Regressions with the poverty variable excluded, reported in an earlier version of this paper, yield results on other variables comparable to those in tables. Hence inclusion of the variable does not mar interpretation of the other regression coefficients.

DATA APPENDIX

Cross-SMSA Data

1. AFDC recipients

Source: Bureau of the Census, *Statistical Abstract of the United States*, 1971, section 33: Metropolitan Area Statistics.

2. Average annual rate of growth of personal income, 1958-1969

Source: Bureau of the Census, *Statistical Abstract of the United States*, 1971, section 33: Metropolitan Area Statistics.

3. Average hourly earnings 1970 of production workers on manufacturing payrolls

Source: Bureau of Labor Statistics, *Employment and Earnings States and Areas 1939-74*, Bulletin 1370-11.

4. Black population as percentage of total population

Source: Bureau of the Census, 1970, Census of Population, *General Characteristics of Population*, 1970, table 24: Age by Race and Sex, for Areas and Places: 1970.

5. City size (population of central city)

Source: Bureau of the Census, *Statistical Abstract of the United States*, 1973, section 34: Metropolitan Area Statistics.

6. Demographic variables

Source: Bureau of the Census, 1970, Census of Population, state volumes, *Detailed Characteristics*, 1970, table 164: Employment Status by Race, Sex, and Age: 1970.

Calculations: 16-17 year olds demographic variable = 16-17 year old male civilian population/total male civilian population. Demographic variables for 18-19 year olds and 20-24 year olds calculated in the same way.

7. Employment variables (employment rate, unemployment rate, labor force participation rate)

Source: Bureau of the Census, 1970 Census of Population, Detailed Characteristics, 1970, table 164: Employment Status by Race, Sex, and Age: 1970 for total group table 166 Employment and Status and Hours Worked of Persons 14 to 34 year olds, by school enrollment, age, race, and sex: 1970; for persons not enrolled in school.

8. Female headed households as percentage of all households

Source: Bureau of the Census, County and City Data Book, 1972: Statistical Abstract Supplement, table 3: Standard Metropolitan Statistical Areas.

9. Industry indices

Sources: Percentages of civilian labor force employed in each industry, by SMSA: Bureau of the Census, County and City Data Book, 1972: Statistical Abstract Supplement, table 3: Standard Metropolitan Statistical Areas. Persons employed in each age group as percentage of total persons employed by industry: Bureau of the Census, 1970 Census of Population, Detailed Characteristics: United States Summary, table 239: Age of Employed Persons by Industry and Sex: 1970.

Calculations: Industry index for 16-17 year old males =[$\sum_{\text{all industries}}$ (industry share of labor force in SMSA x fraction of industry labor force that is 16-17 years old)/ fraction of total U.S. labor force that is 16-17 years old.)

10. Percent of families below low-income level

Source: U.S. Bureau of the Census, Statistical Abstract of the United States 1973, Section 34: Metropolitan Area Statistics.

11. State minimum wage laws

Source: Bureau of Labor Statistics, Youth Unemployment and Minimum Wages, Bulletin 1657, 1970, pp. 133-134, Chapter IX Appendix B: Basic adult minimum wage rates and specified differential rates by state, June 1969.

Time Series Data

12. Time-series average hourly earnings of production workers on private payrolls

Source: Employment and Training Report of the President, 1978, p. 265, table C-3, Gross Average Weekly Hours, Average Hourly Earnings, and Average Weekly Earnings of Production or Nonsupervisory Workers on Private Payrolls, by Industry Division: Annual Averages, 1947-1977.

13. Time-series minimum wage

Source: Bureau of Labor Statistics, Youth Unemployment and Minimum Wages, Bulletin 1657, 1970, p. 182, table 12.2: Proportion of earnings covered by the Federal minimum wage.

14. Time-series demographic variables

Source: Employment and Training Report of the President, 1978, p. 183, table A-3: Civilian Labor Force for Persons 16 Years and Over, by Sex, Race, and Age: Annual Averages, 1948-1977; p. 186 table A-4: Civilian Labor Force Participation Rates for Persons 16 Years and Over, by Race, Sex, and Age: Annual Averages, 1948-1977.

Calculation: Male civilian population for each age group and total number of persons in civilian labor force for cohort x 100)/Civilian labor force participation rate for cohort.

- 16-17 year olds demographic variable = 16-17 year old male civilian population. Demographic variables for 18-19 year olds and 20-24 year olds calculated in the same way.

15. Time-series labor force participation rate

Source: Employment and Training Report of the President, 1978, p. 186, table A-4: Civilian Labor Force Participation Rates for Persons 16 Years and Over, by Race, Sex, and Age; Annual Averages, 1948-77.

16. Time-series unemployment rate

Source: Employment and Training Report of the President, 1978, p. 212 table A-19: Unemployed Persons 16 Years and Over and Unemployment Rates, by Sex and Age: Annual Averages, 1948-77.

17. Time-series employment ratio

Calculations: Employment Ratio = (1 - unemployment rate/100) x labor force participation rate.

The Dynamics of Youth Unemployment

Kim B. Clark
Lawrence H. Summers*

Introduction

At any given moment approximately 2 million teenagers are unemployed. Another 600 thousand are out of school and neither working nor looking for work. Only about 60 percent of all teenagers and 25 percent of black youth who are out of school are employed. These high rates of joblessness have been a source of concern to both economists and policy makers. This paper seeks to clarify the dimensions of the youth employment problem, by analyzing the distribution of unemployment and related patterns of labor force mobility. We are led to four primary conclusions.

First, most youth joblessness is due to a small part of the population who are out of work for extended periods. Normal turnover accounts for a negligible fraction of youth unemployment. In March of 1976, for example, the average unemployed teenager had been out of work almost four months and could expect to wait an additional 3.5 months before finding work. He could expect to experience over 8 months of joblessness during the calendar year. The evident concentration of joblessness suggests the existence of a serious social problem.

Second, for the vast majority of young people, the labor market functions exceptionally well. Almost half of all job changes among teenagers occur without intervening unemployment. Close to two thirds of entrances into employment occur without measured unemployment. Most spells of unemployment are quite brief. It is important to understand that the ease with which most transitions occur says little about the experience of the extensively unemployed population who account for most of the youth employment problem.

*We are grateful to James Buchal, James Poterba and Daniel Smith for assistance with computation.

Third, the unemployment/not-in-labor force distinction is virtually meaningless for young people. The behavior of most of the unemployed and many persons outside the labor force is functionally indistinguishable. Indeed, for men out of school, the probability of moving into employment is only slightly greater for the unemployed than it is for persons outside the labor force. The evidence suggests that attention should be focused on the youth non-employment problem, rather than merely on unemployment.

Fourth, the level of employment among teenagers depends critically on available employment opportunities. The sharp cyclical sensitivity of youth employment belies the suggestion that the unemployed do not really want work, or that they are incapable of working productively. The cyclical evidence suggests that a shortage of attractive jobs is the root cause of the youth non-employment problem.

I

Characteristics of the Teenage Labor Market

In recent years it has become fashionable to view youth unemployment as the result of high rates of turnover. On this view, youth unemployment is not due to a shortage of jobs for young people. Rather, it occurs because young people, especially teenagers, are unwilling or unable to hold jobs for very long and thus move from job to job with brief intervening spells of unemployment. Presentations of this "turnover" view of youth unemployment typically focus on flows between unemployment and employment. Less attention is devoted to movements into and out of the labor force. This section tries to present a fuller picture of the youth labor market by examining in a systematic way movements between all three labor market states (i.e. employment, unemployment, and not in the labor force (NILF)). We extend previous work on the dynamics of the youth labor market by focusing on the differences in behavior between young people who are in and out of school. After presenting the basic data characterizing the dynamics of youth labor markets, we examine the relative importance of transistions into and out of the labor force as well as the duration of completed spells in each of the labor market states.

The Basic Data

The dynamics of the youth labor market are examined in this section using the BLS gross changes data. Individuals included in the Current Population Survey are in the sample for four months, then out for eight months, and then in the sample for four months before leaving for good. The data in this study are derived from a special file which matches the March, April, May, and June Surveys taken in 1976. It is possible to follow one rotation group over the entire period and several rotation groups over shorter intervals. From these data it is possible to find the number of individuals who moved, for example, from unemployment to employment during the preceding month. Since there are three possible labor market states, nine monthly flows may be calculated.

We summarize the available information in a 3 x 3 matrix of transition probabilities and a vector of three stocks. Thus, for each of several demographic groups we consider the matrix:

$$P = \begin{vmatrix} P_{ee} & P_{eu} & P_{en} \\ P_{ue} & P_{uu} & P_{un} \\ P_{ne} & P_{nu} & P_{nn} \end{vmatrix}$$

where, for example, P_{eu} represents the proportion of employed workers last month who are unemployed in the current month. Since a worker must always be in one of the three labor force states, the rows of P sum to 1. Therefore, if any two of the transition probabilities out of a state are known, it is easy to compute the third. In order to calculate aggregate flows between states, we multiply the transition probabilities by appropriate initial stocks. This may be conveniently represented in matrix form as:

$$\begin{vmatrix} F_{ee} & F_{eu} & F_{en} \\ F_{ue} & F_{uu} & F_{un} \\ F_{ne} & F_{nu} & F_{nn} \end{vmatrix} = \begin{vmatrix} S_e & 0 & 0 \\ 0 & S_u & 0 \\ 0 & 0 & S_n \end{vmatrix} P \qquad (2)$$

where F_{ij} represents the flow of workers into state j from state i and S_e, S_u, and S_n refer to the stock of workers employed, unemployed and not in the labor force (NILF) respectively.

Since much of the emphasis in this study is on labor force transitions, it will be convenient to define a state L, for labor force, which includes both E and U. It is clear that:

$$F_{nl} = F_{ne} + F_{nu}$$
$$F_{ln} = F_{en} + F_{un} \qquad (3)$$

The transition probabilities may then be represented as:

$$P_{nl} = P_{ne} + P_{nu}$$
$$P_{ln} = \frac{E(1)\ P_{en}}{L(-1)} + \frac{U(-1)\ P_{un}}{L(-1)} \qquad (4)$$

Transition Patterns

In Table 1.1, we report average flow rates and transition probabilities for teenagers and mature adults as calculated from the March- April and the April-May CPS samples. Except for in-school youths it does not appear that the results are seasonally aberrant. For the total male and female teenagers, the probabilities are consistent with average of values from 1968-1976.

An important feature of these data is the enormous magnitude of all the flows. For example, the results suggest that about 15 percent or 645 thousand young men withdrew from the labor force. At the same time about 20 percent of those outside the labor force entered the market.

The differences between persons who are in-and out of school are particularly striking. Among young men who were in school, a very large proportion, almost half the unemployed, drop out of the labor force within a month. Slightly more than one-fifth find jobs. Almost one-third of the out of school group find jobs, while only 18 percent withdraw from the labor force. It is noteworthy that in the out of school group the job finding probabilities of

Table 1.1

Employment, Unemployment and Labor Force Transitions March-May 1976

Demographic/Schooling Groups		en	eu	ue	un	ne	nu	[illegible]	[illegible]
M1619	Total								
	P	.105	.042	.272	.307	.074	.129	.203	.147
	F	330.3	147.0	237.3	294.6	253.8	450.5	704.4	644.[illegible]
	In School								
	P	.173	.033	.217	.479	.061	.111	.172	.246
	F	241.1	46.0	94.9	209.6	209.1	380.4	589.5	450.5
	Out of School								
	P	.053	.049	.310	.185	.134	.210	.344	.077
	F	109.2	101.0	142.4	85.0	44.7	70.1	114.9	194.0
F1619	Total								
	P	.131	.024	.254	.357	.070	.101	.171	.174
	F	411.2	72.9	185.0	257.2	298.1	438.6	736.6	669.1
	In School								
	P	.209	.023	.163	.515	.057	.090	.147	.272
	F	265.5	29.2	54.3	171.6	201.3	317.8	519.1	437.8
	Out of School								
	P	.080	.024	.333	.218	.105	.131	.236	.104
	F	145.7	43.7	130.7	85.6	96.8	120.8	217.5	231.3
M2559	Total								
	P	.009	.010	.323	.081	.053	.082	.135	.013
	F	332.2	369.1	685.1	171.8	162.6	251.6	414.2	504.0
W2559	Total								
	P	.044	.009	.182	.305	.038	.071	.109	.061
	F	1033.8	211.5	293.0	491.1	767.3	1433.7	2201.0	1524.9

Note: F indicates flow in thousands; P indicates probability; en indicates employment not in the labor force; eu indicates employment to unemployment, and so forth.

Source: Tabulations of the March-April-May-June 1976 CPS Match File: The flows have been adjusted to conform to the stock data. The probabilities are averages of the monthly probability for April and May.

persons who are out of the labor force are quite close to those of the unemployed. While 32 percent of unemployed young men accept employment within a month, almost 22 percent of those outside the labor force find a job. Since the probabilities of exit from unemployment declines quite sharply with duration, it appears that persons outside the labor force have as much chance of moving into employment as do persons unemployed for a significant period. As one would expect, the labor force distinction appears to be much more meaningful in the case of in-school youth, where only 11.1 percent find jobs within a month.

The differences between male and female transition probabilities are quite small. The largest difference is that young women appear to be much less likely to re-enter the labor force than young men. When they leave employment they are also more likely to withdraw from the labor force rather than becoming unemployed. Not surprisingly, there are large differences between youth and adult transition probabilities. While the differences are much less pronounced for the out-of-school group, young people appear to be much more likely to enter and withdraw from the labor force. For example, 14.7 percent of male teenagers withdraw from the labor force each month compared to 1.3 percent of mature men. Similarly 20.3 percent of persons outside enter contrasted with 13.5 percent for adults.

It is clear from Table 1.1 that observed changes in the participation and unemployment of young people, reflect a net of large gross movements into and out of the labor force. The importance of labor force entrance and exit in explaining youth employment and unemployment is documented in Table 1.2. The data in line 1 illustrate the importance of flows from outside the labor force in changes in employment. Between 60 and 70 percent of all entrances into

Table 1.2

Relative Flows into and Out of Not-in-Labor Force, March-May 1976

	Demographic/Schooling Groups							
	Males 16-19			Females 16-19			Males 25-59	Females 25-59
Flow Category	total	in-school	out of school	total	in school	out of school		
1. Proportion of flows into employment from NILF ($F_{ne}/(F_{ne}+F_{ue})$)	.655	.800	.330	.703	.854	.480	.269	.836
2. proportion of flows out of employment into NILF ($F_{en}/F_{en}+F_{eu}$))	.714	.840	.520	.845	.901	.769	.474	.839
3. proportion of flows out of unemployment into NILF ($F_{un}/F_{un}+F_{ue}$))	.530	.688	.374	.584	.760	.396	.200	.626
4. proportion of flows into unemployment from NILF ($F_{nu}/F_{nu}+F_{eu}$))	.633	.820	.307	.804	.873	.689	.306	.784
5. proportion of flows into the labor force which result in employment ($F_{ne}/F_{ne}+F_{nu}$))	.635	.645	.610	.591	.612	.555	.607	.651

Source: See tabl 1

employment occur from outside the labor force. The second line indicates that most of teenagers who leave employment leave the labor force rather than becoming unemployed. Among out of school women, this pattern is particularly pronounced; over 80 percent of employment exiters withdraw. Lines 3 and 4 indicate that labor force transitions are almost as important in determining flows into and out of unemployment. A large fraction of unemployment spells appear to begin and end outside the labor force.

These results indicate the artificiality of the not-in-labor-force unemployment distinction for young people. Given the frequency of movements between unemployment and not in labor force, it is difficult to distinguish between these two states. Most of the newly employed did not search long enough to be recorded as unemployed. The evidence suggests the possibility that for many teenagers, job search is a passive process in which the main activity is waiting for a job opportunity to be presented. This conclusion is especially true of enrolled young people. Their extremely high, withdrawal rate (80 percent) suggests that their job search is extremely casual. The ease with which most young people enter the labor force, documented in line 5 of the table, supports this view. While only about-third of the unemployed find a job within a month, almost two-thirds of labor force entrants are successful within a month. This strongly suggests that many people only enter the labor force when a job is presented.

The patterns of entrance suggest that the availability of jobs is an important element in determining movements into and out of the labor force. At the same time, the evidence indicating that most teenagers end spells of employment by withdrawing from the labor force provides some indication that teenage unemployment arises from voluntary turnover. Among unemployed teenagers, the quit rate is about half the job loss rate. However, it seems reasonable to conjecture that a large proportion of those who withdraw from the labor force following employment are quitters. If, for example, it is assumed that 80 percent of this group is made up of quitters, it follows that about two-thirds of teenage employment spells end in quits. For males in the 20-24 age group, about 60 percent of employment separations end in quits. This illustrative calculation underscores how misleading sole focus on unemployment can be. Of course, quits may reflect the perceived low quality of available employment opportunities, as well as variation in the return from alternative uses of time.

Spell Durations

The results on flows and rates of transition in Tables 1.1 and 1.2 underscore the dynamic character of the youth labor market. The tremendous volatility in the market behavior of young persons may also be conveyed by examining the mean duration of completed spells in each of the states. It should be emphasized that the estimates presented below differ from the mean duration of those currently in each state. As Kaitz (1970) has shown, the former concept will yield lower estimates than the latter. Table 1.3 presents estimates of mean duration of completed spells in each state. The brevity of mean durations for most groups is quite striking. Male teenagers, for example, have an average duration of a spell of employment of only about 6.5 months.

Out of school young people have longer durations on the job, about 9 months, compared to about four months for enrolled teenagers. Since persons can remain employed but change jobs, these figures overstate the expected duration of a job. The only available evidence, from a 1963 BLS survey, suggests athat about 54 percent of teenage job changes occur without intervening non-employment. Adjusting for this flow yields the estimates of the mean duration

Table 1.3

Labor Market Durations

Demographic/Schooling Groups	Duration Category D_e	D_{job}	D_n	D_u
	(mean duration in months)			
M 16-19				
total	6.80	3.00	4.93	1.73
in school	4.85	2.13	5.81	1.44
out of school	9.80	4.31	2.91	2.02
F 16-19				
total	6.45	2.84	5.85	1.64
in school	4.31	1.90	6.80	1.47
out of school	9.62	4.23	4.24	1.81
M 25-59	52.6	24.1	7.41	2.48
F25-50	19.9	8.7	9.17	2.05

Note: D indicates mean duration, e, n, u represent employment, not-in-labor force and unemployment. Mean duration for these states is defined as the reciprocal of the probability of leaving the state. D_{job} is the duration in a job and is equal to $D_e(1-d)$, where d is the fraction of job changes with no unemployment. The values of d used here are the same for men and women. Estimates of d are from Bancroft and Garfinkle, "Job Mobility in 1961," *Monthly Labor Review* (August, 1973), pp. 897-906.

of jobs shown in column 2. Jobs held by young people do not appear to last very long. The mean duration of a job for all male teenagers was 3 months. Even for out of school men the average job lasted a little over 4 months. In interpreting these figures, several factors should be recognized. First, the figures are based on exit probabilities calculated from March-April and April-May transitions. Hence, they are unaffected by brief summer jobs. Second, these estimates overstate the mean duration of jobs and employment because of the sampling interval. Individuals who are unemployed for less than a month may never appear as unemployed in the survey, so their employment may incorrectly appear unbroken. Similarly, very brief employment spells which would bring down the average, may never be recorded. It appears, then, that the typical teenage job may last much less than the 3 month estimate reported here. Below, we will examine some implications of the brevity of employment spells.

Columns 3 and 4 illustrate the brevity of unemployment and out of the labor force spells. Perhaps the most surprising result is the brevity of spells outside the labor force for out-of-school youth. The average NILF spell for this group lasts three months, which is only slightly longer than the average spell length of the unemployed. This is further evidence that these states are functionally almost indistinguishable. There appear to be relatively small differences between men and women, with somewhat more persistence in withdrawal among women. A striking feature of the results is that the mean duration of unemployment is not much different for teenagers and adults. The much higher teenage unemployment rate results from a larger frequency rather than a longer duration of unemployment. For most teenagers, the labor market functions well.

Seasonal Variation in Labor Market Flows

Perhaps the most striking evidence of the success of the youth labor market in meeting the needs of most young people comes from evidence on seasonal fluctuations. In Table 1.4, we examine the changes over the year in various key labor market rates for males 16-19. Seasonal patterns do not vary much among youth groups, and the male 16-19 group is fairly typical. The first line provides the unemployment rate for the summer months and the remainder of the year. No significant increase in the unemployment rate occurs during the summer months. Indeed, the rates in May, July, August and September are actually lower than the rate over the rest of the year. Of course, the number of unemployed persons rises substantially because as the second row shows, the participation rate soars. The participation rate in July is almost 40 percent more than its annual average. As line 3 indicates, a parallel rise in the employed proportion also takes place. Not surprisingly the vast majority of this increase in employment is due to summer-only workers. In the fourth line of the table, we present the proportion of the population who enter the labor force each month. In June, almost 21 percent of the male teenage population enters the labor force. This figure represents close to 50 percent of the NILF category. Another 12 percent of the population enter the labor force in July. Of course, a certain amount of labor force entrance occurs in all months, averaging about percent of the population. Contrasting this figure with the entry rates for May, June and July one finds that during the summer months about an extra 20 percent of the population enter the labor force. Note that this is a substantial underestimate of the extent of the increase in youths' labor supply, since

Table 1.4

Seasonal Variation in Labor Market Stocks and Flows
Male 16-19, 1968-1976

	AVERAGE FOR:						
Stock/Flow Category	May	June	July	August	September	Rest of Year	Annual
1. unemployment rate	.129	.182	.152	.122	.149	.160	.155
2. participation rate	.541	.704	.758	.701	.541	.527	.578
3. employment ratio	.471	.575	.643	.615	.459	.442	.488
4. labor force inflow as a percent of the population	.086	.213	.117	.060	.057	.073	.087
5. labor force outflow as a percent of the population	.077	.054	.067	.118	.217	.071	.086
6. probability of successful labor force entry (P_{ns})	.711	.655	.670	.676	.630	.622	.641
7. unemployment inflow as percent of population	.025	.073	.039	.019	.021	.028	.031
8. probability of finding a job if unemployed (P_{ue})	.269	.332	.386	.312	.280	.249	.277

Source: Unpublished tabulations by the Bureau of Labor Statistics, adjusted by the Urban Institute as described in J. E. Vanski, "Recession and the Employment of Demographic Groups: Adjustments to Gross Change Data," in Holt, C. C., *et al*, *Labor Markets, Inflation, and Manpower Policies*, Final Report to the Department of Labor, Washington, D.C.: The Urban Institute (May, 1975).

many teenagers shift from desiring part time to seeking full time work during th summer months. Comparisons of the seasonality in teenage labor market behavior with the patterns observed for other demographic groups leads us to conclude that about three-quarters of summer entrances are due to school ending rather than fluctuations in employment opportunities.

Not surprisingly, the high rates of labor force entrance in June and July are mirrored by high rates of labor force exit in August and September. During these months, about 33 percent of the teenage population exits from the labor force. Since the rate of withdrawal in a typical month is about 7 percent, the extra labor force exits during August and September almost exactly offset the extra entrances in the early summer months. Thus, both the flow and the stock data suggest that employment only during the summer months characterizes the behavior of about 20 percent of male teenagers.

The labor market appears to adapt very well to the surge in those seeking employment. In June when the inflow is at its peak, about two-thirds of labor force entrants find jobs. This figure is actually greater by about 5 percent than the rate of successful entry during the remainder of the year. Those who do become unemployed during the summer months fare much better than the unemployed in other months, as the job finding rate P_{ue} in May, June, and July far exceeds the rate in the non-summer months. The fact that these flow rates are significantly higher during the summer months suggests that the additional members of the labor force may have an unemployment rate much lower than that of full year workers. Clearly, the average unemployment rate over the summer months is lower than during the rest of the year. This suggests that the summer influx of teenagers actually reduces the average annual unemployemnt rate, since the additional workers appear to fare substantially better both as labor force entrants and as unemployed job seekers than do other teenagers. This quite striking fact bears further comment.

Undoubtedly, public employment and training policy affects the behavior of labor market flows during the summer months. Over the first 6 years of the period covered in Table 2.1, (1968-1973), the federal government provided about 600 thousand summer jobs through the Neighborhood Youth Corps. The NYC was eliminated with the enactment of CETA in 1973, but summer jobs remain a component of the decentralized employment and training system. In 1976, for example, just over 820 thousand jobs were provided in the CETA summer program. The great majority of participants were classed as economically disadvantaged (95.9 percent),

drawn from the unemployed or from outside the labor force (98.7 percent), and were full time students (87.8 percent). A comparison of the size of the federal summer program with the average flow into the labor force reveals the relative importance of the summer jobs program. From 1968-1976, an average of 600 thousand summer jobs were provided through NYC and CETA. The data in Table 2.1 suggest that about 3 million teenagers left school and entered the labor market each summer. Given the estimated probability of entering with a job (about .6 on average), on the order of 1.2 million teenagers would remain without employment if no adjustments were made. Thus, about 50 percent of this group were moved into employment through the federal jobs program. This calculation is likely to overstate, perhaps substantially, the contribution of public policy. We have assumed that the federal jobs constitute net job creation. It is likely however, that the federal program funds some jobs which would have existed anyway. This is more likely to be the case under CETA, where the program largely is run through state and local government units. Unfortunately, estimates of the net jobs created under the summer programs are not available. We plan to examine the impact of the summer jobs policy in future research.

The limited size of the summer jobs program clearly suggests that a large number of young people are able to find jobs in the private sector. The ability of the job market to accommodate an almost 50% increase in those desiring work without any increase in the unemployment rate is testament to an impressive set of institutional and market adaptations. The most important of these is undoubtedly the scheduling of vacations to coincide with the availability of additional workers. It is likely that to some extent firms schedule certain kinds of relatively menial work for the summer, when suitable workers become available. Undoubtedly, some adjustment in wage rates also takes place.

The ability of the labor market to deal with the large inflow of workers in summertime should lead one to question demographic explanations of recent increases in youth unemployment. As Table 1.4 shows, the labor market is able to deal with a three-fold increase in the proportion of the population newly seeking work, without an appreciable increase in individual's difficulty in finding employment. It seems improbable that the same labor market should be incapable of adapting to the easily forseen, persistent, and much smaller increase in the labor force due to demographic shifts. Indeed, the problem should be much simpler because in this case the time frame is much longer and there is no need to create very temporary jobs. While adaptations such as replacing vacationing workers and work scheduling are less feasible in this case, the longer run should permit much greater flexibility.

Taken together, the results in this section convey a picture of an enormously dynamic labor market. It is apparent that most teenagers move easily between labor market states. More than half of all job changes occur without intervening unemployment. Most labor force entrants find jobs without ever being measured as unemployed. Most incidents of unemployment are quite brief. There appears to be no evidence that most teenagesrs have serious problems. Yet we did observe in March of 1976 that almost one-fifth of all young people who wanted jobs did not have them, and that an equal number were out of school and jobless, but had chosen not to search. The key question then is whether these average probabilities, which suggest that movement in all directions is quite easy, are relevant to a large part of non-employment. We turn to this question in the next section.

II

The Experience of the Non-Employed

There are at least three reasons why the picture of the labor market presented in the preceding section may be a misleading guide to the experience of the unemployed population at a point in time. First, even if most unemployment spells are short, most unemployment may be contained in long spells. To see this, consider the following example. Suppose that each week 20 spells of unemployment began lasting one week, and one began with a duration of twenty weeks. The mean duration of a completed spell of unemployment would be 1.05 weeks, but half of all unemployment would be accounted for by spells lasting 20 weeks. Equivalently, in a steady state, the expectation of the length of time until a job was found, among all those unemployed at any instant would be 9.5 weeks. Sole focus on the mean duration of a completed spell could clearly be quite misleading.

Second, as we have already emphasized, there is reason to doubt the salience of the unemployment not-in-the labor force distinction for young people. Unemployment durations appear to be short in large part because of high rates of labor force withdrawal. The brevity of many spells outside the labor force suggests that many of those who withdraw are in fact sensitive to labor market conditions. Indeed, it appears that our official statistics frequently record two brief spells of unemployment, broken by a period outside the labor force, when a single spell of joblessness would be more appropriate.

The third sense in which it is necessary to go beyond the average transition probabilities is the need to study the incidence of multiple spells. As Richard Layard has emphasized in his contribution to this volume, one's view about the welfare consequence of youth non-employment should depend on its concentration. If the burden is quite evenly dispersed, individuals are unlikely to suffer greatly and the economy may even benefit from a better matching between workers and jobs. On the other hand, if the distribution of unemployment is very uneven, the welfare cost to individuals is likely to be greater, and the social benefit much more dubious.

In this section, we try to deal with these three issues by studying the distributions of unemployment and non-employment weeks. Basically, we seek to answer two questions. First, how long can we expect the teenagers who are unemployed at a point in time to wait before entering employment? Second, how much unemployment and non-employment can they expect to suffer within the year? It is crucial to realize that we seek to answer these two questions for all those unemployed at a point in time, rather than all those who flow into unemployment over some interval. This procedure gives more weight to long spells than to short ones, since persons suffering lengthy spells are more likely to appear in the sample at a point in time. In assessing the nature of the unemployment problem, one wants to study the unemployed population, not the experience of persons flowing into unemployment. This key point is illustrated by the numerical example above in which much of unemployment was due to long spells eventhough the vast majority of spells were short.

How long does it take to find a job?

In Table 2.1, we present various estimates of how long it takes young people to find jobs. The first row displays the mean duration of completed unemployment spells. The durations of unemployment, as we have already noted, are quite

Table 2.1

Alternative Measures of the Duration of Joblessness

	Demographic Group						
	males 16-19			females 16-19			
Duration Category	total	in school	out of school	total	in school	out of school	Males 35-64
1. mean duration of unemployment (months) $1(P_{ue}+P_{un})$	1.73	1.44	2.02	1.64	1.47	1.81	2.48
2. expected time until next employment spell for those currently unemployed* (months)	5.38	7.19	2.96	6.64	9.41	4.24	4.30
3. average months of unemployment to date	2.86	2.38	3.34	2.98	2.67	3.29	4.91
4. expected time between beginning of current spell of unemp. and next spell of employment for those currently unemployed **	8.24	9.57	6.30	9.62	12.08	7.53	9.21
5. mean duration of non-employment (months) $\left(\frac{U+N}{U P_{ue} + N P_{ne}}\right)$	6.37	8.13	3.73	8.17	10.39	5.22	5.54
6. expected total weeks of non-employment for those currently non-employed***	—	—	7.46	—	—	10.44	11.08

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[a] this is equal to $\frac{D_u + P_{ex} D_n}{1-P_{ex}(1-P_{ne})}$ where D_u and D_n are durations in unemployment and non-employment, P_{ex} is the fraction of unemployment spells which end in labor force withdrawal, and P_{ne} is the probability of entering the labor force with a job.

** line 4 is line 2 + line 3.

*** line 6 is line 5 multiplied by 2; this concept is only meaningful for the out of school group.

Source: the probabilities underlying the calculations are taken from tables 1 and 2.

short. As we have noted, however, labor force withdrawal makes this a misleading indicator of the ease of job finding. In line 2 we attempt to answer the more meaningful question of how long the unemployed must wait until a job is found. This calculation recognizes the possibility of labor force withdrawal and the attendant decline in the probability of finding a job. The possibility of labor force re-entrance into unemployment is also taken into account. The average unemployed male teenager in March of 1976 could expect to wait 5.4 more months before finding a job. Line 3 notes that the average male 16-19 had been unemployed for months. Hence, the average unemployed person was in the midst of a spell of over 2.86 months of joblessness. The notion that most of those currently unemployed can and will find jobs quickly is simply false. Most are in the midst of lengthy spells without work.

Even the large estimates above may understate the ease of movement into jobs. We have argued that many persons who are out of the labor force behave in ways which are functionally equivalent to the unemployed. In line 5 we report the expected length of time until a job is found for currently non-employed young people. Doubling this figure yields the mean total duration of joblessness for the non-employed. The results indicate that it takes most persons a long time to find a job. The average non-employed young men who is not in school will have been out of work for about 7.5 months before returning to employment. The corresponding figures for women are even larger reflecting greater persistence of labor force withdrawal. All of the estimates in Table 4 are conservative since they do not take account of the fact that continuation probabilities decline with duration.

How extensive is Unemployment?

While the evidence suggests that joblessness is frequently prolonged, we have not yet considered multiple spells. The annual March Work Experience Survey asks all civilian non-institutional respondents in the CPS to describe their work and unemployment experience in the preceeding year. We have used the Work Experience Data to calculate two measures of joblessness. The first is the official definition of unemployment as weeks looking for work or on layoff. This concept is referred to as "non-employment." It is important to note that non-employment excludes weeks out of the labor force for those citing illness, fmaily responsibilities, or "other" as the principal reason for part year work. For these individuals, non-employment is defined as weeks of unemployment. In both calculations, persons who did not participate in labor force are excluded from the sample.

The distribution of unemployment and non-employment for selected demographic groups is shown in Table 2.2 .Of the approximately 6 million young people with labor force experience, about 1.7 million experience unemployment, averaging about three months during the year. The average number of weeks is almost 50 percent greater for the out of school group. While the number of persons experiencing non-employment is not different from the number with unemployment in this sample, weeks of joblessness are significantly greater when time out of the labor force is included. Out of school youth average 6 months of non-employment per person becoming non-employed.

In line 6 of the table we examine the experience of the unemployed population as of a point in time by focusing on the distribution of unemployment and non-employment weeks. Because unemployment weeks are captured randomly by the

Table 2.2

The Concentration of Unemployment and Non-Employment for Teenagers — 1974

	Demographic Groups											
	Males				Females				Non-White			
									Males		Females out	
	total		out of school		total		out of school		out of school		of school	
Total with labor force experience (millions)	5.99		2.82		5.27		2.44		.31		.30	
Total with unemployment (millions)	1.71		.91		1.56		.85		.14		.17	
Average weeks of unemployment per person with unemployment	12.7		18.6		10.4		14.9		20.1		16.4	
Total with non-employment (millions)	1.71		.91		1.56		.85		.14		.17	
Average weeks of non-employment per person with non-employment	16.2		23.2		15.4		24.1		29.0		30.3	
Distribution of individuals and weeks by duration	U	NE	U	NE	U	NE	U	NE	U	NE	U	NE
1-4 weeks												
% of labor force	11.2	10.3	6.2	4.2	14.4	12.6	10.9	6.9	7.5	4.6	17.1	9.0
% of total weeks	6.2	4.4	2.1	1.0	9.4	5.5	4.2	1.6	1.6	.7	3.7	1.0
5-14 weeks												
% of labor force	9.0	7.9	9.7	7.3	8.3	7.2	9.9	7.7	16.5	11.3	17.5	8.0
% of total weeks	24.8	17.0	16.0	9.0	26.8	15.8	19.1	9.1	17.8	8.5	18.8	4.6
15-26 weeks												
% of labor force	4.1	2.8	8.1	5.3	4.0	2.4	8.2	4.8	6.4	2.2	9.2	4.3
% of total weeks	23.8	12.7	28.2	13.7	27.1	11.0	33.2	12.0	14.6	3.4	20.8	5.3
27-39 weeks												
% of labor force	2.3	3.3	4.8	7.2	1.8	2.5	3.5	5.1	8.0	9.0	6.6	7.3
% of total weeks	21.3	24.7	26.1	28.9	19.0	18.2	22.1	20.1	28.6	22.4	19.9	13.9
40+ weeks												
% of labor force	1.9	6.2	3.6	8.4	1.7	6.9	2.4	10.5	7.5	10.4	7.5	28.2
% of total weeks	24.0	41.3	27.6	47.4	17.7	49.4	21.5	57.2	17.3	65.0	37.0	75.1

survey, the statements that "x percent of unemployment weeks are suffered by persons with y weeks of unemployment during the year," and "x percent of the currently unemployed will experience y weeks of unemployment during the year" are equivalent. Both the unemployment and non-employment distributions exhibit substantial concentration, with the preponderance of unemployment attributable to persons out of work more than half the year. Among out of school male teenagers, 54 percent of unemployment, and 76 percent of non-employment were due to persons out of work more than six months. Among young black men who were not enrolled in school, 65.0 percent of the unemployed were out of work more than 40 weeks during the year. As one would expect from these figures, individuals with brief, infrequent unemployment experience contribute only negligibly to overall unemployment. For example, persons out of work less than three months accounted for only 21 percent of non-employment among young men who were out of school. While many teenagers experience short periods of unemployement in moving between jobs, these are of little consequence in explaining total weeks non-employment.

The statistics in Tables 5 and 6 tell a consistent story. Youth unemployment is properly understood in terms of a fundamental failure of the labor market. A small portion of the population finds itself chronically unable to locate satisfactory work. They do not have the same ease of transition which characterizes the remainder of the population. Rather, they wait long periods between jobs. Moreover, they experience frequent unemployment because of frequency with which they leave employment.

Employment Exit and Extensive Unemployment

Many observers regard the brevity of employment spells emphasized in Section I as the root cause of the youth non-employment problem. The results here call that interpretation into question. For most young people frequent job change appears to be possible without extensive unemployment. The median length of unemployment spells is probably about three weeks. Half of all job changes occur without any unemployment at all. A person who held five jobs during the year, and was unemployed during each change for the median length of time, would suffer only 12 weeks of unemployment during the year. Persons with this little unemployment contribute less than one-fourth of all youth unemployment. It is therefore clear that without serious difficulty in job-finding even extreme employment instability could not account for observed patterns of concentrated joblessness.

A similar conclusion is obtained by examining in more detail the experience of young people reporting extensive joblessness. Among persons with over 26 weeks of non-employment, who accounted for 76 percent of joblessness, the average number of unemployment spells was less than two. In many cases these spells were separated by periods outside the labor force rather than by jobs. Hence, this is an overstatement of the average number of employment spells during the year. Even neglecting this correction the average spell length of the extensively non-employed appears to last close to 5 months. Thus, for this group, where the real problem lies, the difficulty is prolonged unemployment rather than frequent joblessness.

Nothing in the preceding paragraphs is inconsistent with the common observation that differences in demographic group unemployment rates are largely due to differences in the frequency of spells rather than their duration. The point here is that for the problem population, it is very difficult to locate a suitable job. The demographic observation simply addresses the incidence of "problem" people in different subgroups of the population. Once it is recognized that non-employment is largely a matter of a small minority of all demographic groups with serious job finding problems, the fallacy of inferring the nature of individual problem unemployment, from comparisons of demographic averages becomes clear.

III

Cyclical Variations in Employment

The cyclical behavior of youth employment and unemployment can shed light on the nature of the non-employment problem. If extensive joblessness occurs only because some young people are essentially unemployable, one would expect changes in aggregate demand to have small effects. On the other hand, a finding that changes in aggregate demand has a large impact on young people would imply the existence of a chronic shortage of attractive jobs. Of course, a finding that aggregate demand has a potent effect on the youth labor market need not imply the desirability of expansionary macro economic policy, which has other perhaps undesirable consequences.

Employment, Unemployment and Participation

The cyclical sensitivity of unemployment is the reflection of two quite different phenomena. Unemployment can increase either because fewer jobs are available or because more workers decide to seek the available jobs. These two sources of unemployment obviously have quite different welfare implications. While the former is almost certainly indicative of a worsening of labor market performance, the latter may reflect an improvement in conditions. Focus only on unemployment rates is thus very likely to be misleading. Moreover, the results in Section I suggest that NILF-unemployed distinction is quite arbitrary. These considerations indicate the importance of examining the cyclical behavior of employment, unemployment, and participation.

These three measures summarize the labor market experience of a given demographic group. They are related by the following identity:

$$\frac{E}{N_i} = \frac{E}{L_i} \, \frac{L}{N_i} \qquad (3.1)$$

where E is employment, N is population, L is labor force, and i indexes demographic groups. Taking logs and differentiating yields:

$$d \ln \left(\frac{E}{N}\right)_i = d \ln \left(\frac{E}{L}\right)_i + d \ln \left(\frac{L}{N}\right)_i \qquad (3.2)$$

Thus changes in the employment ratio may be decomposed into changes in employment and participation rates. Since persons in the labor force are either employed or unemployed it is clear that:

$$d \ln \left(\frac{E}{N}\right)_i = d \ln (1 - UR)_i + d \ln \left(\frac{L}{N}\right)_i \qquad (3.3)$$

where UR is the unemployment rate.

The results of the decomposition in Table 3.1 show clearly the importance of fluctuations in participation during the past few years. For young women, changes in participation are generally much larger than changes in the rate of unemployment. While movements in participation are less pronounced for young men, they still account for a significant part of movements in employment. It is thus clear that serious studies of the youth labor market must examine both unemployment and participation. This point has been driven home by recent experience. Over 60 percent of the increase in youth employment which occurred between 1976 and 1977 was due to increases in employment rather than reductions in unemployment. For black youth, the situation is even more striking. The black male unemployment rate has risen, while at the same time the employment ratio has increased due to the surge in participation.

Table 3.1

Decomposition of Changes in the Employment Ratio

	Percent Change in Employment Ratio	Percent Change in Participation Rate	Percent Change in Employment Rate
MEN 16-19			
Year			
1972-3	4.8	2.4	2.4
1973-4	-0.5	1.5	-2.0
1974-5	-8.2	-2.6	-5.6
1975-6	1.8	0.6	1.2
1976-7	5.3	3.0	2.3
WOMEN 16-19			
Year			
1972-3	5.8	4.1	1.7
1973-4	1.5	3.1	-1.5
1974-5	-4.0	-0.1	-3.9
1975-6	2.9	1.6	1.3
1976-7	3.4	2.9	0.5

Note: Calculations as described in the text.

A Simple Model

The cyclical responsiveness of the youth labor market is estimated using a quite simple model. For each group we postulate that the unemployment rate and participation rate are functions of aggregate demand, seasonal factors, and time. The time trends are included to reflect the impact of slowly changing social trends, and other gradually moving variables omitted from the equation. Seasonal movements are captured with monthly dummies. The basic equations to be estimated are:

$$\ln(PR)_{it} = \beta_0 + \sum_{j=0}^{8} \beta_{t-j}\ \mathrm{UPRIME}_{t-j} + \sum_{k=1}^{11} \theta_k S_k + \delta_1 T + \delta_2 T67 + v_{it} \tag{3.4}$$

$$UR_{it} = \alpha_0 + \sum_{j=0}^{8} \alpha_{t-j}\ \mathrm{UPRIME}_{t-j} + \sum_{k=1}^{11} \gamma_k S_k + \phi_1 T + \phi_2 T67 + u_{it} \tag{3.5}$$

where UPRIME is the unemployment rate of men 35-44, T is the time trend, T67 is a second time trend which begins in 1967, and S_i are monthly dummies.

The specification of (3.4) is traditional in analyses of participation. The prime male unemployment rate is assumed to measure variation in job opportunities and the ease of job finding. Since workers may respond to changes in the availability of jobs with a delay, lagged unemployment is also included in the equation. While equations of this sort have not been extensively used in studying the cyclical behavior of group unemployment rates, they are justified by essentially the same arguments.

The model is not designed to provide the best or most detailed explanation of the participation (unemployment) rate of each group. Our purpose is to estimate a common model for each group which captures the response of participation (unemployment) to cyclical fluctuations in aggregate demand. Thus some potential explanatory variables have been excluded precisely because they vary cyclically. Others have been omitted because they are essentially orthogonal to the variables included.

The specification appears to be quite robust. The results presented below are almost completely insensitive to changes in the measure of aggregate demand, and variations in the way in which the second time trend is entered. Our experimentation suggests that neither demographic variables, inflationary expectations, or measures of household wealth and liquidity have any systematic effect on participation. Moreover, our results decisively reject theories of labor supply which emphasize the timing of participation and the intertemporal substitution of leisure and work, and which explain unemployment as a voluntary phenomenon. In any event, these variables have little impact on the estimate of cyclical effects. We have also experimented with a minimum wage variable. While it is sometimes significant, it has little impact on the estimated cyclical effects and so the results are not reported here.

The interpretation of the coefficients of the model is straightforward. For example, the cyclical responsiveness of the participation rate of the i^th^ group is measured by $\gamma^{i}_{PR} = \Sigma\beta_{t-j}$. A value of 1.0 implies that a 1 percent increase in aggregate demand (e.g., UPRIME declines from .06 to .05) produces a 1 percent increase in the participation rate of the i^th^ group (e.g., .430 to .434). Equations (3.4) and (3.5) have been estimated using both annual and monthly data for the period (1948-1977) for various demographic groups. The identity (1) along with the properties of ordinary least squares insures that the relationship between the employment ratio, aggregate demand and time is given by:

$$\ln(EN)_{it} = \beta_0 - \alpha_0 + \Sigma(\beta_{t-j} - \alpha_{t-j})UPRIME_{t-j} + \sum_{k=1}^{11} (\Theta_k - \gamma_k)S_k + (\delta_1 - \phi_1)t + (\delta_2 - \phi_2)T67 + \ell_i \qquad (3.6)$$

It follows immediately that the equations presented here can be used to decompose cyclical movements in the employment ratio into unemployment and participation components since:

$$\gamma^{i}_{EN} = \gamma^{i}_{PR} - \gamma^{i}_{UR} \qquad (3.7)$$

In order to insure that this identity is exactly satisfied we have estimated all the equations using ordinary least squares without correcting for serial correlation. The results for individual equations, however, are not sensitive to this choice. The estimated equations are shown in Table 3.2.

The principal conclusion which emerges is the tremendous responsiveness of youth employment to aggregate demand. For men 16-19, each one point decrease in the prime male unemployment rate increases the employed proportion of the population by about 4.5 percent. About two-thirds of the response comes through unemployment, with the remainder due to increases in participation. For women 16-19, the cyclical responsiveness estimates are comparable, with participation somewhat more responsive, and unemployment somewhat less responsive to aggregate demand. In line with the traditional view of disadvantaged youth as likely to be "last hired" and "first fired," black youth employment is even more cyclically sensitive than the total group. For black men 16-19, each point reduction in the unemployment rate raises the employment ratio by close to 6.3 percent. A comparable figure obtains for black women.

The substantial cyclic response to changes in aggregate demand suggests that a shortage of job opportunities characterizes the youth labor market. If there were not a dearth of good jobs, aggregate demand would not be expected to have a significant impact on youth employment. The very strong response of participation to unemployment confirms the importance of focusing on employment rather than unemployment in assessing labor market conditions. It also supports the argument of Section I that much of the high rate of labor force withdrawal among the unemployed is attributable to discouragement.

The strong cyclic response of employment and participation to aggregate demand reflects the large inflows and outflows described in the first section. The surges in employment and participation which accompany increases in aggregate demand may be due either to increased inflows or decreased outflows. That is, low unemployment may raise employment either by helping workers get jobs or by helping them hold jobs. In order to examine this issue we have estimated equations describing the time series movements in the monthly flow probabilities. In addition to trend, cycle, and seasonal variables, we also studied the effects of minimum wage legislation and Federal youth employment programs. Since we were unable to isolate a significant effect of either of these measures on transition probabilities, the results of estimating the equations in which they were included are not reported here.

Table 3.3 summarizes the results of the flow probability equations. The first set of equations describes the probability of employment entrance. For all groups, especially men, the rate of entrance is very sensitive to demand. For men, a one point increase in the prime male unemployment rate reduces the probability of entry by .104, or about 9 percent. It is changes in entry rather than exit behavior which are the prime cause of employment fluctuations among young men. The rate of exit does not appear to exhibit significant cyclical fluctuations. The reasons for this difference are not clear. One possibility is that women are the first to be laid off in downturns. A more plausible explanation is that the entrance rate does not fall as unemployment rises, because more women enter the labor force as their family income falls.

Table 3.2

Cyclical Behavior of Unemployment, Participation and Employment
by Teenage Demographic Groups

Independent Variables

Demographic Group/ Dependent Variable	CONS	UPRIME	T	T67	R^2	SEE	DW
			(12x10^2)				
1. Men 16-19: Total							
unemployment rate	.02 (.005)	2.77 (.10)	.35 (.02)	-.15 (.06)	.84	.018	.85
participation rate	-.47 (.01)	-1.87 (.19)	-1.11 (.04)	2.82 (.11)	.95	.035	.73
employment ratio	-.50 (.01)	-4.64 (.20)	-1.45 (.046)	2.98 (.12)	.95	.037	.72
2. Men 16-19: Non-white							
unemployment rate	-.046 (.03)	4.29 (.36)	1.14 (.12)	-.21 (.23)	.69	.051	1.32
participation rate	-.35 ((.03)	-1.99 (.45)	-2.12 (.14)	.84 (.28)	.90	.064	1.13
employment ratio	-.30 (.04)	-6.29 (.59)	-3.26 (.19)	1.05 (.37)	.87	.085	1.27
3. Women 16-19: Total							
unemployment rate	-.009 (.007)	1.78 (.11)	.52 (.03)	-.36 (.07)	.82	.021	.94
participation rate	-.83 (.01)	-2.29 (.22)	-.44 (.05)	3.48 (.12)	.93	.039	.69
employment ratio	-.81 (.01)	-4.07 (.24)	-.96 (.06)	3.84 (.14)	.89	.045	.60
4. Women 16-19: Non-white							
unemployment rate	-.04 (.04)	3.45 (.49)	1.58 (.16)	-.99 (.31)	.58	.070	1.44
participation rate	-1.11 (.05)	-2.96 (.74)	-.22 (.24)	1.02 (.46)	.75	.105	.815
employment ratio	-1.07 (.07)	-6.41 (.92)	-1.80 (.29)	2.00 (.58)	.65	.131	.932

Note: the coefficient on UPRIME is the sum of the coefficients obtained from a nine month Almon lag (first degree, far restriction).

Table 3.3

Cyclical Behavior of Transition Probabilities
1968-1976

(standard errors in parentheses)

	Independent Variables					
Transition Probability/ Demographic Group	CONS	UPRIME	T (12x10^2)$_2$	R^2	SEE	P
Dependent Variable						
1. probability of employment entrance						
M1619	.093	-1.44	-.185	.937	.019	-.050
	(.073)	(.257)	(.105)			(.105)
BM1619	.172	-1.420	-.264	.856	.024	.002
	(.032)	(.357)	(.146)			(.105)
W1619	.051	-.273	.169	.930	.010	-.293
	(.011)	(.110)	(.048)			(.100)
BW1619	.110	-.246	-.206	.796	.017	.029
	(.023)	(.254)	(.104)			(.104)
2. probability of employment exit						
M1619	.229	.213	-.377	.946	.015	-.105
	(.018)	(.194)	(.079)			(.104)
BM1619	.134	-.696	.216	.839	.038	.002
	(.051)	(.557)	(.218)			(.104)
W1619	.250	.591	-.535	.940	.015	-.154
	(.017)	(.184)	(.075)			(.104)
BW1619	.364	-.493	-.714	.793	.048	-.060
	(.059)	(.642)	(.262)			(.104)
3. probability of labor force entrance						
M1619	.063	-.760	.378	.961	.020	-.122
	(.024)	(.266)	(.109)			(.104)
BM1619	.170	-1.148	-.115	.932	.027	
	(.039)	(.435)	(.178)			
W1619	.032	-.036	.324	.959	.012	-.258
	(.013)	(.142)	(.058)			(.101)
BW1619	.104	.291	-.064	.885	.023	-.018
	(.030)	(.377)	(.133)			(.105)

(Continued...)

Table 3.3 continued

Transition Probability/ Demographic Group	Independent Variables					
	CONS	UPRIME	T (12×10^2)	R^2	SEE	P
Dependent Variable						
4. Probability of Labor force exit						
M1619	.255 (.017)	.578 (.190)	-.541 (.077)	.940	.014	-.041 (.104)
BM1619	.170 (.043)	.498 (.478)	.026 (.195)	.851	.029	.112 (.104)
W1619	.280 (.016)	.627 (.173)	-.592 (.071)	.920	.014	-.158 (.104)
BW1619	.238 (.047)	1.23 (.515)	-.149 (.211)	.753	.036	-.004 (.106)

Note: the coefficient on UPRIME is the sum of nine month Almon lag (first degree, far restriction); each regression was estimated with seasonal dummies, and a correcti for first order autocorrelation.

The rates of labor force entry and exit also vary cyclically. The rate of exit falls during recessions largely because the probability of withdrawal is much greater for the unemployed than it is for those who are employed. For the male groups the probability of labor force entrance is strongly cyclical. It is much less cyclical for women because of the added worker behavior noted above.

On balance, the flow probability equations bear out the basic conclusions of this section. They demonstrate that both labor force entry and employment entry become significantly easier during peak periods. This is completely consistent with the findings about the responsiveness of non-employment to the state of local labor markets, noted by Freeman. Taken together with the evidence that most unemployed teenagers are in the midst of spells of prolonged joblessness, these findings suggest that a shortage of attractive jobs accounts for much of teenage unemployment.

IV

Conclusions and Implications

In this section, we discuss the implications of our results for policies designed to combat youth unemployment. Our argument can be stated in quite bold terms. Expansionary aggregate demand policy is the only proven way of enlarging the employment opportunities open to young people. A consistent effort to keep the unemployment rate near its full employment level would do more to help young people find jobs than almost any other conceivable governmental policy. Of course, other considerations might suggest that, on balance, such a policy is not workable. While certain structural policies might have salutory effects, it is highly unlikely that they could succeed except in a full employment economy. After discussing the positive effects of a tight labor market, we turn to an examination of potential structural initiatives.

The Macro-Economy and the Youth Labor Market

As Section III showed, both teenage unemployment and participation respond strongly to labor market conditions. A reduction of one point in the prime-age male unemployment rate raises the proportion of teenagers who are employed by about 4 percent, which is split about 2:1 between a reduction in unemployment and an increase in participation. For black youth the proportion rises about 6.5 percent split in a similar way. These figures imply that the 1975 recession cost young workers about 800,000 jobs. The growth in the economy during the late 1960's created close to 300,000 jobs for young workers. Evidence from cross-section data underscores the responsiveness of teenage unemployment to changes in demand. Freeman (1978) and Clark and Summers (1978) have shown that the youth employment ratio is much higher in strong than in weak local labor markets.

Expansion of aggregate demand is especially potent in making available opportunities for those who are most disadvantaged. Between 1969 when the aggregate unemployment rate was 3.6 percent, and 1976 when it was 7.7 percent, the proportion of 18 and 19 year olds suffering more than 6 months of unemployment rose fourfold. For black youth the same figure increased by almost 6 times. The tremendous impact of demand on the amount of long-term unemployment is particularly important in light of the results of Section I. The evidence presented there suggests that while most teenagers experience little difficulty in moving into and out of employment, most unemployment is concentrated among those who face serious difficulties in obtaining jobs. The teenage unemployment problem is not the lack of desire to hold jobs, but the inability to find work. A shortage of jobs appears to be the only explanation for the large responsiveness of employment to changes in demand. If unemployment were simply a matter of instability, there would be little reason to expect it to respond strongly to aggregate demand.

We conclude that the existence of a job shortage must be the central reality dominating efforts to evaluate or design structural initiatives to improve the labor market for youth. It seems clear, for example, that the existence of a job shortage is of fundamental importance in assessing the policy implications of the instability view of teenage unemployment. We have noted the allegation that high turnover is the principal culprit in high youth unemployment rates which yields policy prescriptions designed to improve school to work transitions and upgrade teenage workers. However, in the face of a job shortage, reduction of turnover will only redistribute the burden of unemployment. Without job vacancies to be filled, or an increase in the number of jobs, reduced instability would simply reduce the frequency and increase the duration of unemployment spells.

Before we turn to an evaluation of potential structural initiatives, it is useful to review the extent to which strong aggregate demand can achieve structural goals. A key objective of almost all structural programs is to aid youth in obtaining the skills and employment experience necessary to succeed in the adult world. These goals are accomplished to a large extent by expansionary macro-economic policies. Between 1969 and 1976 the rate of job loss rose by about 75 percent, substantially reducing the ability of young people to accumulate experience. Cyclical decreases in the youth employment rate also cause reductions in on-the-job training. Standard estimates (e.g. Mincer) suggest that an extra year's experience raises earnings by about 2-3 percent. Ellwood's results in this volume appear to be consistent with this figure. This figure suggests that the 1975-1976 recession reduced by a significant amount the lifetime earnings of the youth cohort. Since each year of youth non-employment costs about $20,000, this implies that the extra non-employment had a present value cost of about 16 billion dollars. This calculation is a substantial underestimate of the true difference which cyclical conditions can make in human capital formation. It ignores the benefits of both worker upgrading and the likelihood that if labor was in short supply employers would compete at least in part, by offering training. When these factors are considered, it is clear that expansionary macroeconomic policy can do a great deal to achieve structural goals.

The Role of Structural Policies

The results in Section III bear out Feldstein and Wright's (1974) conclusion that even if the prime-age male unemployment rate were reduced to unprecedented levels, teenage unemployment rates would remain relatively high. This fact has led many to conclude that only structural measures can make an effective dent in the youth unemployment problem. As we have argued elsewhere, this inference is misleading. Youth unemployment rates remain so high when aggregate demand increases in large part because of increases in participation. In Clark and Summers (1979) we show that if the mature male unemployment rate were driven down to its 1969 level, and participation were not allowed to expand, the teenage unemployment rate would fall to close to 6 percent. The question remains as to what if any contribution structural measures can make. These policies may be divided into three broad categories: 1) programs to aid workers in searching for jobs through job matching or improved information; 2) job training programs designed to provide workers with necessary skills; 3) job creation programs designed to make available special jobs for youth groups.

A detailed review of the evidence and discussion of the effectiveness of job matching, job training and job creation programs is beyond the scope of this paper. Our results, however, suggest the following observations. First, given a shortage of jobs, training and job matching programs offer little prospect for making a significant contribution to the solution of the youth unemployment problem. Aiding any single worker through training or improved transition to work will improve his chances at the expense of others. As long as there are only a fixed number of jobs, total employment cannot be increased by helping all workers augment skills or search more efficiently. Each worker's additional search, for example, detracts from the opportunities open to other workers and so generates a negative externality. Under these circumstances, belief in training and job matching reflects the fallacy of composition. Matching and training programs cannot have the desired effects unless coupled with an expansion in the number of jobs. If such an expansion is forthcoming, and employers experience difficulty in filling vacancies, training and market transition programs could prove useful.

Second, direct job creation through public employment or private sector subsidies appears to offer the most promising structural approach to the youth unemployment problem. Like training programs, the impact of policy can be focused on those groups who account for the bulk of teenage unemployment. Moreover, the policy is directed at the root of the problem: a shortage of good jobs. The success of such programs, however, depends on the extent of net job creation and the provision of skills and experience useful to young persons over the longer term. The evidence presented in Section II suggests that governmental efforts to provide seasonal jobs for disadvantaged in-school youth have met with some success. The effect of other government programs like the Youth Conservation Corps, the Job Corps and Public Service Employment remains an open question in need of further research.

Conclusion

This paper has presented evidence on the characteristics and sources of teenage unemployment. Our results underscore the dynamic character of the youth labor market, but suggest that market dynamics cannot account for the bulk of youth joblessness. The job instability - turnover view of unemployment is applicable to the majority of teenagers who experience little difficulty in moving into and out of the labor force. Most unemployment, however, is concentrated among those people who are unemployed for extended periods, and who face serious difficulty in obtaining employment. The results suggest that the problem of teenage unemployment arises from a shortage of attractive jobs. The evidence in Section III indicates that aggregate demand has a potent impact on the job prospects and market experience of teenagers.

References

Clark, K. B. and L. H. Summers, "Labor Force Transitions and Unemployment," April, 1978, unpublished.

Feldstein, M. S. and Brian Wright, High Unemployment Groups in Tight Labor Markets, H.I.E.R. Discussion Paper #488, June, 1976.

Hilaski, H., "The Status of Research on Gross Changes in the Labor Force," Employment and Earnings, October, 1968.

Kaitz, H., Monthly Labor Review, 1970.

Marston, Stephen, "Employment Instability and High Unemployment Rates," Brookings Paper on Economic Activity, 1976: 1, p. 169.

Mincer, Jacob, Schooling, Experience and Earnings (New York: National Bureau of Economic Research, 1969).

Vanski, Jean, "Recession and the Employment of Demographic Groups, Adjustments to the Gross Changes Data," unpublished.

FAMILY EFFECTS IN YOUTH EMPLOYMENT

Albert Rees and Wayne Gray

I. Introduction

Recent work on youth unemployment has advanced two contrasting models of the youth labor market. One view emphasizes high turnover rather than the shortage of jobs for young people. It can be illustrated by the following quotation from Baily and Tobin: "Much teenage unemployment, it is often observed, comes from dissatisfaction with the available job options, a gap between expectations or aspirations and the realities of low wages and poor working conditions. One consequence is high turnover. Even when jobs are available, therefore, unemployment is high."[1]

The other view stresses the shortage of jobs, noting that "The substantial cyclic response to changes in aggregate demand suggests that a shortage of job opportunities characterizes the youth labor market."[2]

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[1] Martin Neil Baily and James Tobin, "Inflation-Unemployment Consequences of Job Creation Policies," in John L. Palmer, ed., Creating Jobs: Public Employment Programs and Wage Subsidies (Washington: Brookings, 1978), p. 61

[2] Kim B. Clark and Lawrence H. Summers, "The Dynamics of Youth Unemployment", NBER Working Paper No. 274, p. 52

In Keynesian terms, the first view sees much youth unemployment as voluntary at prevailing wages; the second sees it as primarily involuntary. The first view suggests that youth unemployment could be reduced by raising the ratio of youth to adult wages; the second implies that it could be reduced by lowering this ratio.

This paper provisionally adopts the second view and seeks to test one of its implications. If there is a shortage of jobs for young workers at prevailing wages, then there must be one or more nonprice rationing mechanisms that determine which young people get the available jobs. Our special hypothesis is that the family of the young person furnishes such a mechanism; those young people get jobs whose parents or siblings have jobs, particularly jobs in which they can influence hiring decisions. Some support for this view can be found in earlier studies of the labor-force participation of young people. Bowen and Finegan, who found that after controlling for other forces the labor-force participation of married women falls with husband's income, were surprised to find that the adjusted labor-force participation rate of males 14 to 17 in school in urban areas in 1960 rose through the range of other family income between $4,000 and $11,000. In seeking to explain this, they wrote "We suspect that part of the explanation turns on the comparative advantage that youngsters in these families have in finding part-time jobs. For one thing, their parents are more frequently able to help, mainly as a result of their business and social contacts."[3] It is this suspicion that we explore further here.

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[3] William G. Bowen and T. Aldrich Finegan, The Economics of Labor Force Participation, (Princeton, N.J.: Princeton University Press, 1969), p.387.

II. The Data Set

The results presented in this paper are from the cross-sectional data set called the "Survey of Income and Education", collected in the spring of 1976 (April through July). The full sample is a national stratified probability sample of households in which 151,000 households were interviewed. This makes the sample roughly three times the size of the Current Population Survey. The interview includes most of the information available from CPS interviews, plus a good deal of additional detail on sources of 1975 income and on education.

We have analyzed data for men and women aged 17 to 20 living in nonfarm households where they are the children of the head. This excludes those young people who have moved out of their parents' household to live by themselves or establish their own families. The group that was 17 to 20 in 1976 was 16 to 19 in 1975, and one of our dependent variables measures work experience in 1975. Using the ages 17 to 20 in 1976 rather than 16 to 19 also gives us a less unequal division of the sample between those in school and those not in school.

The distinction made here between those in school and those not in school is based on whether or not the person had attended school since February, 1976. The alternative of using major activity in the survey reference week is only viable for those observations collected in April and May, since many June and July observations were collected during school vacations.

The regressions presented in the next section are based on a data file we have created that merges observations on the young person with observations on household income and individual data on other members of the household 16 years of age and older.

III. Regression Results

We have been persuaded by the work of Clark and Summers, among others, that for young people the distinction between being unemployed and being out of the labor force is not always meaningful, since the boundary between these states is so blurred. Accordingly, we use measures of employment as our dependent variables. The two measures shown here are: (a) estimated total hours worked last year (the product of weeks worked and usual hours per week) and (b) a dichotomous variable taking the value of one if the teenager was employed in the survey reference week. The models using both dependent variables are estimated by ordinary least squares, so that the second model is a linear probability model.

We recognize that this model is not strictly appropriate, since the estimated probabilities are not necessarily confined to the zero-one interval. In future work we will re-estimate the final model by logit methods. We have also run regressions using weeks worked in 1975 as the dependent variable. These are very similar to those using estimated hours in 1975, but the fits are not quite as good.

Table 1 shows our estimates of the determinants of estimated hours worked last year for males and females in school and out of school. Table 2 shows the corresponding estimates of the determinants of employment in the reference week.

In general, we get significant effects (at the 5 percent level) for variables measuring schooling, race, being in a female-headed household, and being in a poverty area. We also estimate significant effects for the employment status of siblings, but generally not for the employment status of the head.

Schooling

Since we are dealing with people whose schooling has often not been completed, we measure years of school completed relative to the mean for all people of the same age in the main SIE sample. The variable "education gap 1" measures the number of years above the overall mean for those who are above. "Education gap 2" measures the number of years below the overall mean for those below. Having less education than the average of one's age group lowers employment significantly in all eight regressions.

The three negative signs on "Education gap 1" in Table 1 seem to be an anomaly arising because those people with more education than their age group had a greater than average probability of being in school last year. In Table 2, where the schooling status and dependent variables both refer to the same year, the signs on "Education gap 1: are all positive.

Income

A second set of variables explored measures family income. The one used here, other family income, is the income of the household in 1975 minus the earnings of the young person whose behavior is being measured. This has a consistently negative effect (not always significant) on the employment of young people in school, and a positive effect (not always significant) on the employment of young people who are not in school. In earlier work we used a number of additional variables indicating whether the household received income in 1975 from various kinds of transfer payments. At some stages of our work, a few of these variables showed significant negative effects on some measures of youth employment. However, they did not remain signigicant in the presence of the other variables included in the final model.

Geographical variables

A third set of variables deals with various geographical aspects of the labor market. The data set places observations in one of nine regions of the country. We have included a set of eight regional dummy variables in all regressions as control variables, and there are always some significant differences in youth employment by region. Variables indicating whether or not the household lived in an SMSA or in the central city of an SMSA were not significant. The final model includes a dummy variable taking the value of one if the household lives in an area designated by the Census Bureau as a poverty area. In our sample 12 to 13 percent of youth in school and 17 to 18 percent of youth not in school lived in such areas. This variable has an effect that is consistently negative and usually clearly significant. For youths in school of both sexes, living in a poverty area reduces the probability of employment by 9 percent, other things equal. Since other family income and race appear in the regressions, this should probably be interpreted as measuring the availability of job opportunities in the locality.

We also tried using a variable measuring the total unemployment rate in the SMSA for SMSA's that could be identified in the data set. The unemployment rate was taken from a published external source (Department of Labor estimates for May, 1976) and merged into the data set. Only about one-third of our observations were in areas for which we could use this information. The variable did not have a significant effect even in regressions confined to observations for which the variable could be used. We might have gotten better results by generating unemployment rates by area for spring 1976 from our own data set. However, this would have required processing data on all households; we have used only households including youth.

Race

We have used two variables to identify youth by race, dummy variables identifying blacks and Hispanics. Both are consistently negative and usually significant, with the effect of being black being generally substantially larger than that of being Hispanic. For regressions whose dependent variable is "employed last week", being black lowers the probability of employment by 17 to 24 percent even after controlling for schooling, other family income, and location in a poverty area. For youth not in school, in the regressions Table 1, negative coefficients on the variable identifying blacks are about one-third the size of the mean of the dependent variable. With other measured variables equal, we estimate that black youth not in school worked one-third fewer hours in 1975 than white youth.

We have tried using a variable measuring whether or not the principal language spoken in the household is English; this is less successful than the variable identifying Hispanics.

Family influences

When we started our research, we expected to find powerful influences of the position of the head of the household on the employment status of youth living at home. The effects we find are much weaker than we expected. Living in a household with a female head has a negative effect in all eight regressions, and a significant one in four. Living in a household with a self-employed male head generally has a positive effect, but this is significant only once at the 5 percent level and twice at the 10 percent level.

Sets of dummy variables identifying male heads who were not employed and the major industry or occupation of the employed male heads performed very poorly. So did an index of three-digit occupations scaled by median income in the occupation in 1969. Education of the male head was tried and entered with a negative sign -- that is, it acted like an index of permanent income rather than a measure of access to jobs. In short, we find very little direct support in this data set for our original hypothesis that many youths find employment through contacts generated by their parents. At the same time, we find other family effects that we had not anticipated.

Our second set of variables measuring family effects identifies the employment status of siblings between the ages of 16 and 24 who are in the household. Within this large set, there are four subsets, for older brother, older sister, younger brother, and younger sister.[4] In each of these subsets, there are two dummy variables, e.g. "older brother not employed" and "older brother employed;" the base or omitted variable of the subset is "no older brother living at home."

Employment decisions within the household are presumably made simultaneously, and our single equation model does not permit us to analyze the simultaneity. If we have an observation on a youth named John who is employed and he has an older brother named Fred who is also employed, we detect the association, but we cannot tell whether John found Fred a job, Fred found John a job, or both were subject to some common parental or environmental influence that increased the probability that they are employed. It should [illegible]o be noted that if both of them are between 17 and 20, observations for both will appear somewhere in our regressions with many (though not all) of the independent variables being identical. However, the scheme should permit us to separate the effects of job contacts and the family's work ethic from income effects by examining the signs of the coefficients. The income effect of Fred's working on the probability that John will work is presumably negative.

As shown in Tables 1 and 2, the positive association of employment status among siblings is very strong. For males in school, having an employed sibling significantly increases the dependent variable in all eight cases in the two tables. Having a sibling not employed significantly decreases the dependent variable in all eight cases. For females and males not in school the effects are not always significant, though the signs are almost always the same. Some of the effects for females are also quite large. For example, other measured variables held constant, having a younger brother employed increases the chances of a female in school being employed by 15 percent, or increases her estimated hours worked last year by 104 relative to a mean of 440.

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[4] This scheme of classifying siblings by sex and birth-order was suggested by the work of Claudia Goldin on the employment of youth in Philadelphia in 1880.

The differences in coefficients for siblings of different sexes may support the interpretation that the sibling variables reflect information networks in the labor market, rather than local job availability or parental influence. Because many occupations or industries still employ workers predominantly of one sex, a youth may be better able to help a sibling of the same sex find work. The differences in coefficients may also arise from stronger demonstration effects or closer personal relationships between siblings of the same sex.

The pattern of differences in coefficients is clearest for youth not in school in Table 1. Having a younger brother employed increases estimated hours last year for a male by 185, but for a female by only 19. Having a younger sister employed increases estimated hours last year by 166 for a female, but by only 64 for a male. In both cases the larger figure is clearly significant at the 5 percent level and the smaller is not.

However, we do not want to regard these sex differences as more than suggestive. Clearly, the results still are subject to several possible interpretations, and more work is needed to sort them out.

Table 1

Determinants of Total Hours Worked Last Year

Youth 17 - 20

Independent Variables	Coefficients and t-ratios			
	In School		Not in School	
	Male	Female	Male	Female
Education gap 1	-17.6 (-2.16)	3.52 (0.50)	-155.8 -(4.87)	-89.4 (-2.99)
Education gap 2	-54.0 (-7.54)	-34.0 (-5.14)	-62.9 (-5.85)	-68.9 (-5.66)
Other family income x 10^{-4}	-15.3 (-3.23)	-1.58 (-0.37)	34.7 (2.28)	43.3 (2.66)
Black	-151.0 (-7.18)	-122.4 (-6.55)	-343.3 -(6.99)	-369.1 (-7.40)
Spanish	-70.4 (-2.22)	-60.5 (-2.24)	-230.3 (-3.38)	-194.2 (-2.58)
Female head	-45.5 (-2.67)	-3.6 (-0.24)	-70.2 (-1.84)	8.2 (0.20)
Male head self-employed	34.9 (1.96)	-0.34 (-0.02)	44.3 (0.94)	46.8 (0.92)
Poverty area	-82.0 (-4.45)	-68.2 (-4.06)	-37.1 (-0.92)	-133.8 (-3.00)
Older brother not employed	-91.8 (-4.95)	-43.6 (-2.60)	-183.5 (-3.38)	-52.6 (-0.88)
Older brother employed	32.8 (2.21)	26.0 (1.95)	90.1 (2.30)	-23.5 (-0.59)
Older sister not employed	-60.2 (-2.97)	-40.4 (-2.15)	-107.0 (-1.69)	-57.8 (-0.85)
Older sister employed	35.9 (2.15)	17.7 (1.18)	2.8 (0.05)	78.7 (1.75)

continued...

Table 1 continued.

	In School		Not in School	
	Male	**Female**	**Male**	**Female**
Younger brother not employed	-46.1 (-2.60)	-20.5 (-1.24)	-178.0 (-4.75)	-64.8 (-1.65)
Younger brother employed	132.1 (6.94)	104.4 (5.94)	185.5 (4.79)	19.2 (0.45)
Younger sister not employed	-40.1 (-2.37)	-52.2 (-3.38)	-93.5 (-2.53)	-30.6 (0.78)
Younger sister employed	135.6 (6.40)	137.2 (7.53)	63.9 (1.44)	166.0 (3.43)
Controls for:				
Single years of age	3	3	3	3
Health status	2	2	2	2
Marriage	1	1	1	1
Region	8	8	8	8
Number of observations	9196	8385	3534	2604
R^2	.115	.109	.164	.205
SEE	511.1	440.0	786.7	709.0
Mean of dependent variable	511.9	400.0	1064.2	925.8

Table 2

Determinants of Employment Last Week

Youth 17 - 20

Independent Variables	Coefficients and t-ratios			
	In School		Not in School	
	Male	Female	Male	Female
Education gap 1	.023 (3.07)	.008 (1.05)	.013 (0.74)	.091 (5.20)
Education gap 2	-.037 (5.60)	-.027 (-3.69)	-.038 (-6.42)	-.053 (-7.36)
Other family income x 10^{-5}	-.175 (-3.98)	-.053 (-1.14)	.066 (0.80)	.010 (0.10)
Black	-.215 (-10.95)	-.171 (-8.35)	-.172 (-6.41)	-.238 (-8.13)
Spanish	-.122 (-4.13)	-.087 (-2.93)	-.008 (-0.20)	-.072 (-1.64)
Female head	-.069 (-4.31)	-.016 (-0.96)	-.056 (-2.68)	-.063 (-2.68)
Male head self-employed	.0012 (0.07)	.0055 (0.31)	.047 (1.82)	.072 (2.38)
Poverty area	-.087 (-5.09)	-.091 (-4.92)	-.025 (-1.14)	-.117 (-4.49)
Older brother not employed	-.139 (-8.03)	-.069 (-3.72)	-.073 (-2.46)	-.057 (-1.62)
Older brother employed	.037 (2.64)	.019 (1.31)	.024 (1.10)	.023 (0.98)
Older sister not employed	-.079 (-4.18)	-.103 (-4.99)	-.070 (-2.01)	-.052 (-1.31)
Older sister employed	.039 (2.54)	.050 (3.08)	.042 (1.55)	.038 (1.42)

continued...

Table 2 continued.

	In School		Not in School	
	Male	Female	Male	Female
Younger brother not employed	-.080 (-4.84)	-.053 (-2.94)	-.072 (-3.52)	-.019 (-0.82)
Younger brother employed	.121 (6.83)	.146 (7.54)	.062 (2.91)	.039 (1.56)
Younger sister not employed	-.054 (-3.41)	-.076 (-4.51)	-.011 (-0.56)	-.002 (-0.07)
Younger sister employed	.087 (4.41)	.130 (6.52)	.046 (1.89)	.109 (3.84)
Controls: Same as in Table 1				
Number of observations	9196	8385	3534	2604
R	.088	.069	.108	.224
SEE	.477	.483	.431	.416
Mean of dependent variable	.539	.481	.710	.672

Dead-End Jobs and Youth Unemployment

Charles Brown

The hypothesis that one's job affects one's chances of unemployment is neither new nor very controversial. In every year since 1958, unemployment rates of craft workers have exceeded those of white collar workers, while those of nonfarm laborers have been double those of craft workers. Moreover, a substantial fraction of these differences among broad occupational groups persists after controlling for differences in "personal" characteristics (age, sex, race, education, location) of the workers in them (Marston, 1976, p. 196).

These observations suggest two alternative strategies for further research: (1) improving the controls for differences in personal characteristics with more such variables or more sophisticated statistical techniques; (2) attempting to characterize occupations in a parsimonious way which gives some clues as to why such differences exist. This paper is based on the second strategy. It focuses on young males: young people because their unemployment rates are so high, males to reduce complications which those not in the labor force introduce.

Recent analyses of youth unemployment have emphasized "dead end" jobs as an important factor in youth unemployment, even in relatively prosperous times. Feldstein (1973, p. 14) argued that

> .....high turnover rates and voluntary unemployment are also a response to the unsatisfactory type of job that is available to many young workers. These are often dead-end jobs with neither opportunity for advancement within the firm nor training and experience that would be useful elsewhere.

Similarly, a Washington Post report on unemployment among black teenagers in Washington D.C. asserted that they

> sometimes refuse to take low level jobs as busboys, dishwashers, and janitors because they feel that these jobs cannot offer them money, status, or an opportunity for advancement....(T)eenagers often stay at those jobs only long enough to buy a certain thing or qualify for unemployment [benefits]. (emphasis added)

The importance of the conceptual distinction between "low-wage" jobs and those which offer no chances for advancement was noted by Hall (1970, p. 395): "trainees in banks and workers in service stations receive about the same hourly wages, but the trainees have an incentive to work hard and steadily that is absent for the service station men."

While the relationship between wages and unemployment has received considerable attention, the independent impact of opportunities for advancement has received less attention. Two factors appear to be responsible for this omission. First, while the notion that disadvantaged workers may end up in jobs with low wages and little prospect of advancement is present in the writings of human capital theorists (e.g., Rosen, 1972, p. 338), it has received much greater emphasis in dual labor market theories (Piore, 1971; Gordon, 1972, Chapter 4). Because both attributes are seen as common to the "secondary" labor market, the dichotomy between low-wage, no-advancement jobs and high-wage jobs with opportunities for advancement has been stressed, to the exclusion of separate analysis of each component. Second, existing occupational indices -- e.g., the Ducan index, the Dictionary of Occupational Titles' General Educational Development and Specific Vocational Preparation scales -- measure current position rather than opportunities for advancement. "Apprentice" classifications receive low ratings, because they measure what a job requires, not what it promises.[1]

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[1] In the NLS Young Men's file, SVP scores range from 0-9 years; apprentice occupations are coded 2 months. For the Ducan index (100-point scale), the median score for apprentice occupations was 33.

In this paper, occupational characteristics which are intended to capture "dead-end" or "secondary market" attributes are used to explain unemployment among young men. The data--occupational characteristics based on the 1970 Census and labor-force status and personal characteristics of individuals from the Current Population Survey--are described in section 1. Characteristics related to opportunities for advancement are emphasized. In section 2, the relationship between these characteristics and youth unemployment is explored. Some support for the "dead-end" job hypothesis is found, but several puzzles also emerge. Conclusions are offered in section 3.

Data

The 1970 Census ascertained individual's occupation and industry in 1965 as well as in 1970, making it a unique source of data on the (realized) prospects for advancement in each occupation. The aspect of dead-end jobs emphasized in the introduction was the lack of orderly career advancement. This suggests that, whatever the average wage which such occupations pay, those who are in them can't expect future wages to be much higher.

The average current wage in the occupation can be measured by W_i, the average 1970 wage of those in occupation i with less than 10 years of labor market experience.[2] The future prospects of those now in occupation i are measured by the actual 1970 wage of those who were in the occupation five years earlier. Thus, W_i' is the average 1970 wage of those who were in occupation i (with less than 10 years of experience) in 1965, regardless of 1970 occupations.

More precisely, let $W_i(t, t_0, j)$ be the period t wage of those who are/were in occupation i, with j periods of experience, in period t_0. Realized "opportunities for advancement" involve a comparison of $W_i(1965, 1965, j)$ and $W_i(1970, 1965, j)$. If wages grow uniformly at rate g within each occupation-experience cell from 1965 to 1970, $W_i(1965, 1965, j) = (1+g)^{-1} W_i(1970, 1970, j)$. In the simpler notation of the previous paragraph, $W_i(1970, 1970, j) = W_i$ and $W_i(1970, 1965, j) = W_i'$.

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[2] Labor market experience since school-leaving is measured by age minus estimated school-leaving age. School-leaving ages for each level of schooling are from Mincer (1974, p. 38).

Knowing the previous occupation of each individual is critical when occupation-changing is common.[3] Without such information, one is forced to infer opportunities for advancement from a purely cross-sectional wage-experience profile (e.g., Landes, 1977, p. 529). But this compares, for example, apprentice carpenters five years out of school with apprentice carpenters ten years out of school, missing the fact that much of the return to being an apprentice carpenter depends on not being an apprentice carpenter (i.e., being a "regular" carpenter) five years later.

W_i and W_i' were tabulated by 3-digit occupation from the 1/100 Public Use File. Average weekly wages were calculated as the ratio of total earnings to total weeks worked in the year preceeding the Census.[4] Average hourly wages were calculated as total earnings divided by total hours worked, the latter being approximated by weeks worked last year times hour worked in the week preceeding the Census. These averages were based on roughly 200 out-of-school men with less than 10 years experience per occupational cell -- a sample size unattainable with any other data source.

Having calculated W_i and W_i' one can ask which occupations provide the best prospects for future wages, given the level of current wages. A simpler answer is provided by regressing $\ln(W_i')$ on $\ln(W_i)$ and calculating the residuals.[5] Dead-end occupations are expected to have substantial negative residuals, while those in occupations which promise advancement should have positive residuals. Table 1 lists the 60 largest occupations by this criterion, using hourly wage data. The list is restricted to "large" occupations in order to minimize the importance of sampling variation.

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[3] In the 60 most common occupations (i.e., those in Table 1), occupation-changing was quite important for those with less than ten years of experience. The fraction of those in an occupation in 1965 who were in the same occupation in 1970 ranged from 17 to 96 percent, the median being only 54 percent.

[4] The actual calculation was slightly more complicated. W was calculated separately by occupation for those with 0-4 and 5-9 years of experience. The "final" W was computed as a weeks-weighted average of the two experience groups, corrected for differences in experience composition.

It is not clear which occupations should be rated high or low on such an index on a priori grounds. My own a priori candidates for high-advancement jobs -- apprentice categories -- do not appear in Table 1 because no apprentice category achieved sufficient cell size. Other ways of generating Table 1 (using weekly wages or a non-logarithm estimating function) produced similar (though certainly not identical) rankings.

One disturbing feature of Table 1 is the high rating given to a few occupations which seem doubtful as sources of training or other avenues of advancement (farm laborers, gas station attendants). A plausible explanation for these "outliers" is that initial wages are so low in these occupations that the individual is likely to advance subsequently simply by leaving them.[6] Thus, if some occupations have substantial negative transitory

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[5] Occupations were included in the regression if W_i' and W_i were each based on at least 10 observations; occupations were weighted according to number of individuals used in calculating W_i'.

[6] An analysis of the occupational transitions made by those intially in these occupations was consistent with this interpretation. Less than half of the workers in these two occupations were in the same occupation five years later, and there was little evidence of systematic movement to related occupations. (In general, the occupational transitions revealed only two patterns: remaining in one's prior occupation was the most frequent single outcome, and some workers in most occupations moved to supervisory (foreman, manager, n.e.c.) positions. Movements to skill-related occupations seemed surprisingly infrequent.)

Tabl[illegible]
Occupations by Wage-[illegible]th Residual

3-Digit Code	Occupation	Residual	N	3-Digit Code	Occupation	Residual	
65	PHYSICIANS:MED.,OSTEO.	.1678	554.	410	BRICKMASONS,STONEMASONS	-.0057	263.
305	BOOKKEEPERS	.1422	274.	694	MISC.OPERAT.	-.0074	557.
552	PHONE INST.,REPAIRMEN	.1023	438.	680	WELDERS,FLAMECUTTERS	-.0092	804.
822	FARM LABOR.,WAGE WORK.	.0968	1052.	643	PACKERS,WRAPPERS:X MEAT,PRODUCE	-.0103	267.
623	GARAGE WORK.,GAS STATION ATTEND.	.0942	606.	11	CIVIL ENG.	-.0105	322.
31	LAWYERS	.0865	586.	231	SALES MGR.,DEPT.HEADS:RETAIL	-.0106	291.
233	SALES MGR.,X RETAIL	.0775	315.	522	PLUMBERS,PIPEFITTERS	-.0119	555.
265	INS.AGENTS,BROKERS,UNDERWRITERS	.0744	870.	23	ENG.,NEC	-.0129	357.
1	ACCOUNTANTS	.0601	978.	610	CHECKERS,EXAMINERS,INSPEC.:MANU.	-.0131	529.
374	SHIPPING,RECEIVING CLERKS	.0524	620.	715	TRUCK DRIVERS	-.0160	2474.
430	ELECTRIANS	.0495	727.	395	NOT SPEC. CLERICAL WORK.	-.0221	597.
153	ELEC.,ELECTRONIC ENG.TECHNIC.	.0460	349.	602	ASSEMBLERS	-.0223	1129.
152	DRAFTSMEN	.0433	652.	751	CONST.LABOR.:X CARPENTERS' HELPERS	-.0230	1091.
801	FARMERS:OWNERS,TENANTS	.0324	1254.	481	HEAVY EQUIP.MECH.,INCL.DIESEL	-.0265	612.
202	BANK OFFICERS,FINAN.MGR.	.0313	525.	12	ELEC.,ELECTRONIC ENG.	-.0293	589.
640	MINE OPERAT.,NEC	.0197	323.	144	SEC.SCH.TEACH.	-.0331	788.
140	TEACH.,COLL.,UNIV.	.0169	275.	142	ELEM.SCH.TEACH.	-.0358	797.
510	PAINTERS:CONST.,MAINT.	.0167	406.	690	MACH.OPERAT.:MISC.,SPEC.	-.0352	1243.
903	JANITORS,SEXTONS	.0154	682.	415	CARPENTERS	-.0390	1103.
935	BARBERS	.0106	269.	441	FOREMEN,NEC	-.0399	1459.
705	DELIVERYMEN,ROUTEMEN	.0095	821.	692	MACH.OPERAT.:NOT SPEC.	-.0437	908.
912	COOKS:X PRI.HHOLD.	.0091	413.	964	POLICEMEN,DETECTIVES	-.0459	632.
245	MGR.,ADMIN.,NEC	.0079	3735.	695	NOT SPEC. OPERAT.	-.0498	727.
473	AUTO MECH.	.0033	1492.	14	MECHANICAL ENG.	-.0505	318.
631	MEAT CUTTERS,BUTCHERS:X MANU.	.0020	325.	706	FORK LIFT,TOW MOTOR OPERAT.	-.0563	329.
381	STOCK CLERKS,STOREKEEPERS	.0011	463.	461	MACHINISTS	-.0567	752.
162	ENG.,SCIENCE TECHNIC.,NEC	.0006	306.	436	EXCAVATING,GRADING,ROAD MACH.OPER.	-.0635	358.
785	NOT SPEC. LABOR.	.0005	882.	753	FREIGHT,MATERIAL HANDLERS	-.0667	605.
762	STOCK HANDLERS	-.0030	475.	755	GARDENERS,GROUNDSKEEPERS:X FARM	-.0673	294.
422	COMPOSITORS,TYPESETTERS	-.0048	298.	86	CLERGYMEN	-.0972	388.

effects (low W_i) they might mistakenly show substantial, positive advancement ($\ln W_i' - \ln W_i$). This possibility should be kept in mind when considering the results in section 2.[7]

A second, somewhat more tentative index can also be constructed. To the extent that what is "learned" on the job is industry-specific, those who are on career paths should remain in the same industry, even if they change occupational title or accept a position with a different employer. Those in jobs where such learning is absent have no particular incentive to find a new job in the same industry. Thus, a plausible index of advancement opportunities in an occupation is the probability that a worker in that occupation will be in the same industry at some point (five years) in the future. This probability was computed directly from the 1970 Census 1/100 File, using 3-digit industries.

Table 2 presents the 60 largest occupations according to this index. The rankings seem (to me) more plausible than those in Table 1, but that may be due largely to the fact that this index is not constructed to be uncorrelated with the logarithm of current wages, so that low-wage occupations are more prominantly represented among the "worst" occupations according to this index. However, $\ln(W_i)$ is held constant in the regressions in section 2.

Three other occupational characteristics were taken from published 1970 Census data: median years of schooling, percent female, and percent black. (U.S. Census Bureau, 1973, Tables 1 and 38.) They are most easily interpreted as measures of the labor-market disadvantage of the members of each occupation. They may also reflect the relative opportunities for advance-

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[7] Regressing W_i on the characteristics of those in each occupation is not a helpful first step in solving this problem since negative residuals would be expected for both high-training and negative-transitory occupations.

Table 2.
Occupations by Industry-Retention Rates

3-Digit Code	Occupation	Retention	N
140	TEACH.,COLL.,UNIV.	.8444	315.
86	CLERGYMEN	.8404	445.
144	SEC.SCH.TEACH.	.8373	922.
552	PHONE INST.,REPAIRMEN	.8350	509.
31	LAWYERS	.8253	666.
142	ELEM.SCH.TEACH.	.8149	929.
65	PHYSICIANS:MED.,OSTEO.	.8148	637.
14	MECHANICAL ENG.	.7808	365.
964	POLICEMEN,DETECTIVES	.7790	751.
12	ELEC.,ELECTRONIC ENG.	.7712	660.
11	CIVIL ENG.	.7655	371.
522	PLUMBERS,PIPEFITTERS	.7432	662.
233	SALES MGR.,X RETAIL	.7413	375.
631	MEAT CUTTERS,BUTCHERS:X MANU.	.7247	385.
935	BARBERS	.7178	326.
801	FARMERS:OWNERS,TENANTS	.7156	1575.
202	BANK OFFICERS,FINAN.MGR.	.7074	605.
481	HEAVY EQUIP.MECH.,INCL.DIESEL	.6972	710.
23	ENG.,NEC	.6967	386.
430	ELECTRIANS	.6845	862.
441	FOREMEN,NEC	.6795	1747.
245	MGR.,ADMIN.,NEC	.6694	4374.
422	COMPOSITORS,TYPESETTERS	.6638	348.
153	ELEC.,ELECTRONIC ENG.TECHNIC.	.6634	407.
510	PAINTERS:CONST.,MAINT.	.6623	539.
265	INS.AGENTS,BROKERS,UNDERWRITERS	.6437	1002.
152	DRAFTSMEN	.6412	694.
410	BRICKMASONS,STONEMASONS	.6236	364.
162	ENG.,SCIENCE TECHNIC.,NEC	.6221	344.
435	EXCAVATING,GRADING,ROAD MACH.OPER.	.6220	455.
1	ACCOUNTANTS	.6020	1098.
231	SALES MGR.,DEPT.HEADS:RETAIL	.5927	329.
706	FORK LIFT,TOW MOTOR OPERAT.	.5914	394.
610	CHECKERS,EXAMINERS,INSPEC.:MANU.	.5892	628.
415	CARPENTERS	.5836	1388.
280	SALESMEN,SALES CLERKS,NEC	.5777	4326.
690	MACH.OPERAT.:MISC.,SPEC.	.5630	1460.
473	AUTO MECH.	.5628	1759.
381	STOCK CLERKS,STOREKEEPERS	.5562	543.
461	MACHINISTS	.5455	836.
640	MINE OPERAT.,NEC	.5448	402.
680	WELDERS,FLAMECUTTERS	.5433	935.
395	NOT SPEC. CLERICAL WORK.	.5378	662.
692	MACH.OPERAT.:NOT SPEC.	.5330	1062.
715	TRUCK DRIVERS	.5330	3013.
694	MISC.OPERAT.	.5224	1005.
753	FREIGHT,MATERIAL HANDLERS	.5217	715.
602	ASSEMBLERS	.5201	1296.
912	COOKS:X PRI.HHOLD.	.5172	522.
374	SHIPPING,RECEIVING CLERKS	.5158	698.
903	JANITORS,SEXTONS	.5074	816.
822	FARM LABOR.,WAGE WORK.	.5071	1331.
762	STOCK HANDLERS	.4927	548.
755	GARDENERS,GROUNDSKEEPERS:X FARM	.4751	362.
785	NOT SPEC. LABOR.	.4638	1022.
705	DELIVERYMEN,ROUTEMEN	.4626	936.
643	PACKERS,WRAPPERS:X MEAT,PRODUCE	.4618	314.
695	NOT SPEC. OPERAT.	.4203	847.
751	CONST.LABOR.:X CARPENTERS' HELPERS	.3942	1380.
623	GARAGE WORK.,GAS STATION ATTEND.	.2400	725.

ment in occupations, to the extent that blacks, women, and those with less education choose low- training occupations (Rosen, 1972, p. 338) or are crowded into them (Bergmann, 1971).

These occupational characteristics were matched to the 1973-75 May Current Population Survey according to the individual's 3-digit occupation code. Apart from the restrictions noted above (male, not in school, less than 10 years of experience), the matching process imposes the additional requirement that the individual report an occupation. This excludes (1) all those who have never worked, whether they are unemployed or out of the labor force at the time of survey; (2) most of those not in the labor force.[8] The first exclusion is inherent in the study of "occupation effects"; the second leads to the exclusion of all those not in the labor force from the regressions presented below.[9]

In addition to whether the individual was unemployed at time of survey, the CPS determined the reason for unemployment. Those who report they "have a job or business from which [they were]...on layoff last week" are counted as having "lost" their last job. Those who reported they started looking for work because they "lost or quit a job at that time" are counted as "lost" or "quit", respectively. Consequently, those who dropped out of the labor force between quitting or losing their previous job and beginning their current spell of unemployment probably aren't captured in either the

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[8] Those in "rotation groups" 4 and 8 who had worked in the last 5 years are asked their occupation by the CPS.

[9] Those in "small" occupations--those in which published characteristics were unavailable or with less than 10 individuals in the 1/100 file--were also deleted.

"lost" or "quit" categories, though they are counted as unemployed.

Finally, the CPS files provided several potentially important individual characteristics: race, education, age (and hence experience), location, marital and veteran statuses. Moreover, hourly earnings and union membership were determined for those who were working, who had a job but were absent or on layoff, or who had worked in the last three months.

2. Results

Equations in which personal and job chatacteristics are used to explain unemployment are presented in Table 3. The dummy variables indicating being unemployed at time of survey are multiplied by 100, so that each regreggion coefficient can be interpreted as that variable's "effect" on the unemployment rate, measured in per cent. The number in parentheses below each coefficient is the standard error. The number in brackets is the product of the regression coefficient and the variable's standard deviation. It reflects the impact of a one standard deviation change in the independent variable on the unemployment rate and can, in that sense, be compared across variables.

The equation in column 1 of Table 3 includes only "personal" characteristics as independent variables. There are few surprises. The coefficients of the three regional variables show that unemployment is considerably lower in the South than elsewhere, but there is very little difference among the three other regions (North East, North Central, and West). Living in an SMSA or a poverty area is associated with a higher unemployment rate, and a standard deviation difference in the area poverty rate has a considerable impact. Even with other personal characteristics controlled, whites have an unemployment rate nearly five percentage points lower than nonwhites. Married men with spouses present enjoy considerably lower unemployment, while veterans' unemployment rate is almost one percentage point higher than others'. Schooling has a considerable impact, with the unemployment rate declining one point per year of schooling. Perhaps the strongest surprise is the failure of the two experience variables to achieve "significance." Experience was defined as years since estimated school leaving, following Mincer (1974, p. 48). The two experience variables allow the experience-unemployment relationship to have a different slope in the first two years than later on, in response to Ornstein's (1971, p. 417) finding that young workers appear to spend roughly two years finding their place in the labor market. The standard errors of these variables' coefficients are increased by the sample selection, which limits the range of experience, and the estimated effect in the first two years is probably reduced by eliminating those without work experience.

Columns 2-5 reflect the addition of various occupational characteristics into the equation. The coefficients of the personal characteristics,

Table 3
Unemployment Equations
Males with Less than 10 Years Experience

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Dependent Variable = Unemployed(x 100)				Dependent Variable = Unemployed(x 100)		
	Mean	All	Lost	Quit	Mean	All	Lost	Quit
Constant		67.7* (5.23)	21.6* (3.00)	7.90* (2.12)		45.9* (5.66)	11.9* (3.85)	7.40* (2.30)
North Central	.284 (.451)	-2.43 (.448) [-.110]	.354 (.257) [.160]	.034 (.181) [.015]	.285 (.452)	.408 (.393) [.184]	.024 (.267) [.011]	.338* (.160) [.153]
South	.308 (.462)	-2.97* (.458) [-1.37]	-1.09* (.262) [-.504]	-.238 (.186) [-.110]	.319 (.446)	-.721 (.402) [-.322]	-.457 (.273) [-.204]	.039 (.164) [.017]
West	.184 (.388)	-.337 (.498) [-.131]	-.668* (.286) [-.259]	-.227 (.202) [-.088]	.187 (.390)	.197 (.435) [.077]	-.179 (.296) [-.070]	-.072 (.177) [-.028]
In SMSA	.697 (.459)	.753 (.379) [.346]	-.344 (.218) [-.158]	.254 (.154) [.117]	.699 (.459)	-.194 (.328) [-.089]	-.681* (.222) [-.313]	.184 (.133) [.084]
Per Cent Poor in Area	11.3 (10.8)	.077* (.018) [.832]	-.013 (.010) [-.140]	.012 (.007) [.130]	11.2 (10.7)	.026 (.015) [.278]	-.014 (.011) [-.150]	.001 (.006) [.011]
Schooling	13.0 (2.59)	-.747* (.088) [-1.93]	-.213* (.051) [-.552]	-.189* (.036) [-.490]	12.9 (2.55)	-.343* (.082) [-.875]	-.159* (.056) [-.405]	-.071* (.033) [-.181]
Experience	4.15 (2.87)	-.245 (.279) [-.703]	-.167 (.160) [-.480]	.204 (.113) [.585]	4.16 (2.84)	-.335 (.243) [-.95]	-.129 (.165) [-.366]	.099 (.099) [.281]
Max(0, Experience-2)	2.51 (2.44)	-.030 (.322) [-.073]	.145 (.185) [.354]	-.258 (.131) [-.629]	2.51 (2.42)	.230 (.280) [.557]	.034 (.191) [.082]	-.106 (.114) [-.256]
White	.895 (.306)	-3.91* (.552) [-1.20]	-.472 (.317) [-.144]	.093 (.224) [.028]	.901 (.299)	-.771 (.486) [-.230]	-.309 (.330) [-.092]	.291 (.198) [.087]
Married,Spouse Present	.640 (.480)	-4.59* (.364) [-2.20]	-.300 (.208) [-.144]	-1.07* (.148) [-.514]	.676 (.468)	-1.80* (.320) [-.842]	-.400 (.218) [-.187]	-.347* (.130) [-.162]
Veteran	.351 (.477)	.742* (.351) [.354]	-.044 (.201) [-.021]	.106 (.142) [.051]	.357 (.479)	.000 (.302) [.000]	.155 (.205) [.074]	.122 (.122) [.058]
ln(Hourly Earnings)					6.02 (.489)	-.504 (.379) [-.246]	.475 (.258) [.232]	-.673* (.154) [-.329]
Union Members					.284 (.451)	.402 (.332) [.181]	1.31* (.226) [.591]	-.306* (.135) [-.138]
Median Schooling in Occupation	12.3 (2.11)	-.709* (.165) [-1.50]	-.307* (.095) [-.648]	-.019 (.067) [-.040]	12.4 (2.11)	-.554* (.145) [-1.17]	-.161 (.099) [-.340]	-.037 (.059) [-.078]
Per Cent Female in Occupation	17.8 (20.6)	.012 (.009) [.247]	.003 (.005) [.062]	.008* (.004) [.165]	18.0 (20.7)	.004 (.008) [.083]	.002 (.005) [.042]	.004 (.003) [.083]
Per Cent Black in Occupation	8.64 (7.03)	.148* (.032) [1.04]	.046* (.019) [.323]	.019 (.013) [.134]	8.81 (7.00)	.023 (.029) [.161]	.025 (.019) [.175]	-.005 (.012) [-.035]
ln(Current Wage in Occupation)	-3.44 (.299)	11.9* (2.26) [3.56]	7.68* (1.29) [.230]	.237 (.915) [.071]	-3.45 (.277)	9.60* (2.16) [2.66]	5.49* (1.47) [1.52]	-1.14 (.881) [-.316]
ln(Future Wage in Occupation)	-3.23 (.293)	-3.88 (2.43) [-1.14]	-3.14* (1.39) [-1.51]	.735 (.983) [.215]	-3.23 (.275)	-4.05 (2.24) [-1.11]	-3.95* (1.52) [-1.09]	1.58 (.912) [.434]
Retention Rate	61.2 (12.5)	-.142* (.019) [-1.78]	-.031* (.011) [-.388]	-.020* (.008) [-.250]	61.1 (12.4)	-.094* (.017) [-1.16]	-.029* (.012) [-.360]	-.010 (.007) [-.124]
Mean of Dependent Variable		6.60	1.99	.983		3.57	1.60	.566
Number of Observations	23714	23714	23714	23714	18361	18361	18361	18361

Standard errors in parentheses;coefficient x standard deviation of variable in brackets. *=t-statistic greater than 2.0 in absolute value.

taken as a group, are not greatly affected by the additional variables. Even granting the crudeness of the occupation variables, the small change in the coefficients of the poverty area and race coefficients is striking. Schooling does lose up to 40 percent of its estimated effect (column 5 vs. column 1), suggesting that a non-negligible fraction of the advantage of those with more schooling comes from access to "better" occupations.

In colum 2, each occupation's current and future wage, and its three-digit retention rate are added to the equation. Each is highly significant. A higher current wage is associated with a higher unemployment rate (when personal characteristics are held constant).[10] However, if only the current wage is added to the personal characteristics, its coefficient is .156 (.864). The future wage has an almost equally large negative coefficient, as predicted by the "opportunities for advancement" hypothesis. Where the size of this coefficient relative to those of the personal characteristics is, of course, sensitive to scaling, the impact of a one standard deviation difference (three percentage points) is quite large. Finally, the occupation's retention rate" is negative and significant: Individuals in occupations in which industry-switching is less common (higher retention rate) have lower unemployment rates.

A sterner test of the three occupational characteristics is permitted in column 3, where 10 dummy variables for Census broad occupation groups (e.g., "clerical workers") are added to the equation. The occupation's current wage and retention rate are not significantly affected, but the coefficient of the future wage variable falls to one third its previous value and is no longer "significant" at conventional levels. The ten dummy variables are jointly significant at the 1 percent level. These broad-occupation dummies consistently outperformed an alternative set (white collar, blue collar, and farm, with service worker the omitted group) in the sense that one could reject the restrictions of the ten-dummy set's coefficients which the alternative set implied.

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[10] Marston (1976, p. 192) found the probability of becoming unemployed positively related to the individual's wage; Bartel and Borjas (1977, Table 10) found a negative relationship between wage and probability of separation (quit or layoff) for those with "long" tenure, and a non-significant positive relationship for those with short tenure, in the NLS Mature Men sample.

Three additional occupational characteristics are added, with and without the broad-occupation dummies, in columns 4 and 5. Once again, the effect of the current wage and retention rate are not dramatically affected, but the coefficient of the future wage is considerably reduced (column 4 vs. column 2) or eliminated (column 5). The standard error of the future wage variable rises with the addition of the other occupation variables, but the increase is not very large. Two of the three new variables (the occupation's median years of schooling and the fraction of its workers who are black) have substantial effects on the unemployment rate, while the fraction who are female does not.

Modest experimentation with the specification produced similar results. Deletion of the retention rate reduced the current wage variable's impact (though it remained positive and generally "significant") but had little impact on the other occupation characteristics' coefficients. The effect of the current wage variable was significantly positive when weekly wages replaced hourly wages, or when the future wage was deleted. An industry retention rate based on (about 20) broad industries produced similar, slightly weaker results. Median years of schooling, percent female, and percent black were little affected by these experiments.

The relationship between occupational characteristics and unemployment which emerges from these regressions is a good deal more complicated than implied by the discussions cited in the introduction. The three major findings are: (1) A consistent relationship between three measures of occupational advantage (retention rate, median schooling, and racial composition) and unemployment is evident. Whether this reflects the current position or future opportunities provided by the occupation is unclear, since quite plausible a priori arguments can be made for either. (2) The coefficient of the future wage variable was quite sensitive to the other occupational characteristics included, ranging from being a quite important factor to a thoroughly negligible one. The measurement difficulties noted in Section 1 may help to explain its demise as other, correlated variables are added, but this remains a matter of conjecture until these difficulties can be overcome. (3) The broad-occupation dummies were consistently significant when added to any of the equations. This suggests that significant occupational differences in unemployment exist, independent of the variables discussed above. With service workers as the omitted category, white-collar and farm workers had uniformly lower unemployment. Among blue collar workers, craft workers and transport operatives had consistently lower unemployment rates, while unemployment among other operatives and nonfarm laborers was similar to that of service workers.

Table 4 decomposes unemployment by reason for leaving last job. Columns 1, 4, and 7 reproduce columns 1, 2, and 5 from Table 3, and relate

Table 4

Unemployment Equations

Males with No College and Less than 5 Years Experience

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		Dependent Variable = Unemployed (x 100)				Dependent Variable = Unemployed (x 100)		
	Mean	All	Lost	Quit	Mean	All	Lost	Quit
Constant		116.* (16.4)	22.8* (8.96)	18.4* (6.83)		79.5* (16.2)	4.74 (10.6)	18.7* (6.50)
North Central	.288 (.453)	.659 (1.01) [.298]	1.26* (.555) [.571]	.603 (.423) [.273]	.284 (.451)	1.66 (.904) [.749]	.009 (.593) [.004]	.941* (.363) [.424]
South	.338 (.473)	-5.19* (1.05) [-2.45]	-.985 (.575) [-.466]	-.474 (.438) [-.224]	.359 (.480)	-.743 (.925) [-.357]	-.450 (.607) [-.216]	.168 (.372) [.081]
West	.152 (.359)	-1.82 (1.20) [-.653]	-1.00 (.653) [-.359]	-.347 (.498) [-.124]	.155 (.362)	-.493 (1.04) [-.178]	-.567 (.685) [-.205]	-.130 (.420) [-.047]
In SMSA	.642 (.479)	.715 (.823) [.342]	-.072 (.449) [-.034]	.118 (.342) [.056]	.635 (.481)	-.721 (.708) [-.347]	-.844 (.465) [-.406]	.241 (.285) [.116]
Per Cent Poor in Area	13.6 (11.8)	.049 (.037) [.578]	-.002 (.020) [-.024]	.001 (.015) [.012]	13.6 (11.8)	-.001 (.032) [-.012]	-.004 (.021) [-.047]	-.002 (.013) [-.024]
Schooling	11.3 (1.36)	-1.99* (.288) [-2.71]	-.078 (.157) [-.106]	-.661* (.120) [-.899]	11.3 (1.32)	-1.21* (.264) [-1.60]	-.247 (.173) [-.326]	-.479* (.106) [-.632]
Experience	1.86 (1.43)	-.234 (.545) [-.335]	-.216 (.297) [-.309]	.465* (.227) [.665]	1.91 (1.42)	-.316 (.477) [-.449]	-.024 (.313) [-.034]	.201 (.192) [.283]
Max(0,Experience-2)	.544 (.781)	-.090 (.968) [-.070]	.309 (.528) [.241]	-.709 (.402) [-.554]	.553 (.786)	.124 (.831) [.097]	-.256 (.545) [-.201]	-.204 (.334) [-.160]
White	.871 (.335)	-7.02* (1.18) [-2.35]	.960 (.646) [.322]	-.186 (.492) [-.062]	.832 (.323)	-1.35 (1.05) [-.436]	.584 (.689) [.189]	.452 (.422) [.146]
Married,Spouse Present	.424 (.494)	-5.44* (.794) [-2.69]	-.034 (.433) [-.017]	-1.45* (.330) [-.716]	.484 (.500)	-1.88* (.678) [-.940]	-.267 (.445) [-.134]	-.303 (.273) [-.152]
Veteran	.186 (.389)	3.15* (.979) [1.22]	-.286 (.534) [-.111]	.797 (.407) [.310]	.194 (.395)	.412 (.835) [.163]	.450 (.548) [.178]	.487 (.336) [.192]
ln(Hourly Earnings)					5.78 (.434)	.076 (.915) [.032]	1.25* (.600) [.542]	-.689 (.368) [-.299]
Union Member					.294 (.456)	.488 (.756) [.222]	1.62* (.496) [.739]	-.281 (.304) [-.128]
Median Schooling in Occupation	11.2 (1.13)	-1.41* (.581) [-1.60]	-.496 (.317) [-.560]	-.149 (.241) [-.168]	11.2 (1.12)	-1.09* (.505) [-1.22]	-.065 (.331) [-.073]	-.317 (.203) [-.355]
Per Cent Female in Occupation	16.2 (20.1)	.042* (.021) [.844]	.015 (.011) [.302]	.016 (.009) [.322]	15.7 (19.6)	.026 (.018) [.510]	-.005 (.012) [-.098]	.019* (.007) [.372]
Per Cent Black in Occupation	11.8 (7.16)	.173* (.076) [1.24]	.083* (.041) [.594]	.002 (.032) [.014]	11.9 (7.12)	.067 (.066) [.477]	.081 (.043) [.577]	-.030 (.027) [-.214]
ln(Current Wage in Occupation)	-3.60 (.227)	10.9* (4.85) [2.47]	6.47* (2.65) [1.47]	2.02 (2.02) [.458]	-3.59 (.205)	8.61 (4.91) [1.76]	2.91 (3.22) [.596]	-2.32 (1.97) [-.476]
ln(Future Wage in Occupation)	-3.38 (.192)	3.22 (6.44) [.618]	-2.83 (3.51) [-.543]	-.504 (2.68) [-.097]	-3.38 (.184)	2.74 (6.00) [.504]	-1.40 (3.94) [-.258]	3.71 (2.41) [.683]
Retention Rates	55.0 (10.9)	-.179* (.043) [-1.95]	-.024 (.023) [-.262]	-.042* (.018) [-.458]	55.2 (10.8)	-.122* (.038) [-1.32]	-.022 (.024) [-.238]	-.028 (.015) [-.302]
Mean of Dependent Variable		10.9	2.86	1.65		5.63	2.32	.864
Number of Observations	7266	7266	7266	7266	5555	5555	5555	5555

Standard errors in parentheses; coefficient x standard deviation of variable in brackets. *=t-statistic greater than 2.0 in absolute value.

to total unemployment. The remaining columns relate to unemployment due to losing or quitting one's previous job. Thus, in column 2, the dependent variable was one (times the scaling factor 100) if the individual was unemployed due to losing his previous job, and zero otherwise (including other types of unemployment). The difficulties in defining such categories of unemployment in these CPS data should be recalled when interpreting the results.

Given that less than half of the unemployed fall into either the lost or quit category, one expects estimated coefficients to be smaller than in column 1. Indeed, the effect of each variable on "other" unemployment can be gotten by subtracting column 2 and 3 from column 1. In general, the variables which had substantial effects on overall unemployment have substantial effects on this residual category.

Among the personal variables (columns 2 and 3), Southern and Western locations are associated with lower "lost" unemployment, but have negligible effects on the "quit" component. Living in a poverty area has little effect on either component. The large overall advantage of whites does not appear to be attributable to differences in either the "lost" or "quit" components. Being married substantially reduces the "quit" component, but has much less effect on the "lost" component. Schooling remains a significant, negative determinant of both components.

The coefficients of the occupational characteristics vary with the type of unemployment (columns 5, 6, 8, and 9). The positive effect of the occupation's current wage is concentrated on the "lost" category of unemployment, consistent with an equalizing difference interpretation. The lack of impact of occupation's wage on quit unemployment is surprising.[11] A higher future wage in an occupation is associated with lower "lost" unemployment, "significantly" in column 5 and nearly so in column 8. This is consistent with the notion that jobs which offer advancement for the worker are also those which involve investing in the worker by the firm. The future wage has no impact on quit unemployment, and a mildly positive impact on non-layoff unemployment (column 7 - column 8). Thus, there is no evidence that the promise of higher future wages has a significant impact on the more "voluntary" components of unemployment. At a minimum, this contradicts the emphasis of the "opportunities for advancement" hypothesis on quits. The occupation's industry retention rate was significant and negative for both components of unemployment. Omitting this variable tended to increase the other occupational characteristics' coefficients, but not dramatically. Median schooling has a modest coefficient in the "lost" unemployment equation, and the racial composition of the occupation is related to both components. Deletion of the retention rate once again had little effect on the other coefficients.

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[11] Related previous research has used the individual wage as the independent variable: Marston (1976, Table 7: positive, non-significant relationship to probability of becoming unemployed due to layoff and negative, non-significant relationship to becoming unemployed by quitting); Bartel and Borjas (1977, Tables 7 and 4: positive, non-significant relationship to probability of layoff and significant negative relationship to quitting); Leighton (1978, Table 15: positive, significant relationship to probability of layoff); Feldstein (1978, Table 2: positive, sometimes significant relationship to probability of being on temporary layoff unemployment).

The individuals in Tables 3 and 4 are "young" in the sense of having limited labor market experience, but they are not necessarily young in the more usual sense. A high school graduate with 9 years of experience or a college graduate with 4 years of experience would each be 27 years old -- beyond the age which bounds the "youth unemployment problem." Thus, Table 5 is restricted to those who are most likely to be part of "the problem": those with no more than 12 years of schooling, and less than 5 years of post-school experience.

Comparison of Table 5 with Table 4 shows frequently larger coefficients (with greater unemployment, there is more room for sensitivity to the various factors) and much larger standard errors (due to a smaller sample and less variation in independent variables). The most striking differences are the reduced impact of living in a poverty area, the almost complete concentration of the racial effect in the residual unemployment category, and the lack of any effect of the future wage in the last three equations. In general, however, the earlier findings -- both expected and anomolous -- remain.

For about 80 percent of the full sample (i.e., of those in Tables 3 and 4), two additional variables are available in the CPS file: union membership and the individual's hourly wage rate.[12] However, those unemployed who hadn't "lost" their last job were over-represented among the remaining 20 percent. Consequently, among the 18,361 observations for whom union membership and hourly wage were known, the total and "quit" unemployment rates were less than 60 percent of those in the full sample.

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[12] If an hourly wage was not reported directly, the ratio of usual weekly wage to usual hours worked per week was used as the hourly wage.

Table 5
Unemployment Equations, by Type of Unemployment
(Males less than 5 years)er school-leaving, no college)

Variable	Mean (S.D.)	(1) All	(2) Lost	(3) Quit	(4) All	(5) Lost	(6) Quit	(7) All	(8) Lost	(9) Quit
CONSTANT		45.150* (3.665)	4.273* (1.894)	9.742* (1.518)	53.464* (4.303)	8.336* (2.345)	11.168* (1.788)	46.014* (8.412)	-.856 (4.567)	10.878* (3.503)
REGION=NORTH CENTRAL	.284 (.451)	.436 (1.022) [.196]	1.190* (.539) [.337]	.580 (.423) [.281]	.616 (1.020) [.278]	1.240* (.556) [.350]	.610 (.423) [.275]	.553 (1.022) [.250]	1.018 (.557) [.456]	.566 (.425) [.262]
REGION=SOUTH	.308 (.462)	-5.236* (1.057) [-2.419]	-1.029 (.575) [-.475]	-.498 (.437) [-.230]	-5.243* (1.055) [-2.422]	-1.009 (.575) [-.466]	-.492 (.435) [-.227]	-5.251* (1.053) [-2.426]	-.969 (.574) [-.448]	-.463 (.439) [-.214]
REGION=WEST	.184 (.388)	-1.534 (1.201) [-.595]	-.901 (.653) [-.350]	-.301 (.497) [-.117]	-1.658 (1.199) [-.643]	-.939 (.653) [-.364]	-.333 (.495) [-.129]	-1.719 (1.198) [-.667]	-1.033 (.653) [-.401]	-.298 (.495) [-.115]
LIVES IN SMSA	.697 (.459)	.658 (.818) [.302]	-.122 (.445) [-.056]	.132 (.339) [.061]	.615 (.820) [.282]	-.105 (.447) [-.048]	.137 (.340) [.063]	.482 (.826) [.221]	-.028 (.450) [-.013]	.066 (.343) [.030]
PER CENT POOR IN AREA	11.300 (10.800)	.047 (.037) [.506]	-.002 (.020) [-.019]	.001 (.015) [.013]	.055 (.037) [.593]	.000 (.020) [.002]	.002 (.015) [.021]	.056 (.037) [.604]	-.007 (.020) [-.076]	.001 (.015) [.013]
RACE=WHITE	.895 (.306)	-9.054* (1.174) [-2.465]	.566 (.639) [.173]	-.355 (.486) [-.109]	-7.591* (1.175) [-2.323]	.712 (.640) [.218]	-.259 (.488) [-.079]	-6.822* (1.165) [-2.057]	.916 (.645) [.280]	-.184 (.493) [-.056]
MARRIED, SPOUSE PRESENT	.660 (.480)	-5.774* (.792) [-2.771]	-.102 (.431) [-.049]	-1.536* (.325) [-.737]	-5.620* (.794) [-2.702]	-.112 (.435) [-.054]	-1.479* (.329) [-.710]	-5.525* (.797) [-2.652]	-.120 (.435) [-.058]	-1.552* (.332) [-.745]
VETERAN	.351 (.477)	3.218* (.982) [1.535]	-.260 (.534) [-.124]	.820* (.407) [.391]	3.155* (.980) [1.505]	-.281 (.534) [-.134]	.805 (.407) [.384]	3.053* (.979) [1.457]	-.375 (.534) [-.179]	.775 (.407) [.370]
SCHOOLING	13.060 (2.590)	-2.141* (.279) [-5.544]	-.121 (.152) [-.314]	-.691* (.116) [-1.789]	-2.101* (.267) [-5.442]	-.122 (.156) [-.316]	-.662* (.119) [-1.715]	-2.020* (.289) [-5.233]	-.088 (.155) [-.227]	-.692* (.120) [-1.793]
EXPERIENCE	4.150 (2.870)	-.172 (.346) [-.495]	-.171 (.297) [-.492]	.449 (.224) [1.285]	-.171 (.346) [-.491]	-.188 (.297) [-.539]	.463* (.227) [1.328]	-.229 (.345) [-.657]	-.182 (.297) [-.523]	.436 (.227) [1.250]
MAX(0, EXPERIENCE-2)	2.510 (2.440)	-.298 (.971) [-.728]	.217 (.328) [.529]	-.723 (.402) [-1.764]	-.169 (.969) [-.412]	.272 (.328) [.665]	-.709 (.402) [-1.729]	-.052 (.969) [-.128]	.274 (.329) [.669]	-.679 (.403) [-1.656]
LN(OCC'S CURRENT H WAGE)	1.160 (.259)				17.724* (4.469) [5.299]	9.399* (2.435) [2.810]	1.873 (1.855) [.560]	6.389 (5.711) [1.910]	6.053 (3.116) [1.810]	-.237 (2.376) [-.071]
LN(OCC'S FUTURE H WAGE)	1.360 (.253)				-11.961* (3.358) [-3.505]	-9.043* (2.920) [-2.650]	-1.012 (2.224) [-.297]	9.933 (6.881) [2.910]	1.133 (3.752) [.332]	.227 (2.863) [.067]
OCC'S RETENTION RATE	.612 (.125)				-22.960* (6.096) [-2.670]	-4.463* (2.232) [-.563]	-4.641* (1.760) [-.580]	-16.862* (5.332) [-2.106]	-3.056 (2.907) [-.382]	-4.151 (2.218) [-.519]
OCC'S MEDIAN YRS SCHOOL	12.360 (2.110)							-1.013 (.604) [-2.138]	-.197 (.362) [-.416]	-.123 (.276) [-.260]
OCC'S PER CENT FEMALE	17.860 (20.600)							-.007 (.025) [-.152]	-.009 (.014) [-.165]	.010 (.012) [.202]
OCC'S PER CENT BLACK	8.640 (7.030)							.192* (.093) [1.347]	.115* (.051) [.812]	.062 (.039) [.434]
10 Occupation Dummy Variables?		No	No	No	No	No	No	Yes	Yes	Yes
R^2		.034	.004	.011	.039	.006	.012	.047	.012	.015

The restricted sample is inferior to the full sample as a source of information about the relationship between unemployment and occupational characteristics already discussed, but one is limited to the restricted sample for the two "new" variables. Consequently, only the results of these two variables in the restricted sample will be discussed in any detail.[13]

The equation in Table 6 corresponds to those in Table 4, apart from the addition of union membership and hourly wage. Thus, the equation in any column of Table 6 uses the sample dependent variable as the corresponding column in Table 4, and included the independent variables included in that column of Table 4. The results here are fairly insensitive to the addition of other occupation variables, and are consistent with previous research. Union membership is associated with greater "lost" unemployment and less "quit" unemployment; its coefficient in the total unemployment equations is positive but non-significant (though not negligible in columns 1 and 4). The same pattern consistently emerges for the coefficient of the individual's hourly wage: positive for "lost", and negative for "quit", and insignificant for "total" unemployment. When only union membership is added to the personal characteristics, its coefficient also followed the pattern in Table 6 -- positive for "lost", negative for "quit" unemployment, positive non-significant overall. Thus, while unionization may be a

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[13] In general, the absolute value of the occupational characteristics' coefficients declined. Estimating the "Table 4" equations using the restricted sample but not adding union membership and hourly wage led to similar declines in these coefficients, so it was the sample selection rather than the addition of the new variables which was primarly responsible for the change.

Table 6
Union Membership and Individual Wage Coefficients in Unemployment Equations
(Males less than 10 years after school-leaving)

Variable	Mean (S.D.)	(1) All	(2) Lost	(3) Quit	(4) All	(5) Lost	(6) Quit	(7) All	(8) Lost	(9) Quit
Union Membership	.284	.448	1.405*	-.340*	.530	1.362*	-.299*	.003	1.060*	-.348*
	(.451)	(.323)	(.219)	(.131)	(.330)	(.224)	(.134)	(.342)	(.233)	(.139)
		[.202]	[.634]	[-.153]	[.239]	[.614]	[-.135]	[.001]	[.478]	[-.157]
Ln(Hourly Wage)	1.42	-.169	.549*	-.681*	-.324	.538*	-.684*	-.576	.438	-.685*
	(.489)	(.357)	(.242)	(.145)	(.375)	(.255)	(.153)	(.380)	(.258)	(.155)
		[-.082]	[.268]	[-.333]	[-.158]	[.263]	[-.334]	[-.282]	[.214]	[-.335]
10 Occupation Dummy Variables?		No	No	No	No	No	No	Yes	Yes	Yes
R^2		.014	.007	.006	.018	.009	.006	.020	.011	.007
Number of Observations	18361									

"primary" labor market in many respects, it does not seem to be a source of lower unemployment rates for young workers.

3. Conclusions

Occupational characteristics did prove significantly related to the unemployment of young workers with given personal characteristics. This result is not very surprising, given previous research and the limited menu of personal characteristics in the CPS. The more interesting question is the more narrow one: Is there evidence of a relationship between lack of opportunities for advancement and youth unemployment? Unfortunately, the results presented above are too weak to justify either a confident "yes" or a confident "no".

One fairly straightforward way to measure opportunities for advancement is from the wage gains which different occupations provide. The main reservation about this approach is that if transitory variation in earnings is occupation related -- as seems almost certain -- individuals in some occupations will have "low" initial earnings due to these transitory influences, while others will have "low" initial earnings because they are "buying" opportunities for advancement. This measurement problem clearly tends to obscure the effect of opportunities for advancement on unemployment, if they exist. When we turn to the data, we find that the "future wage" variable designed to capture these influences exhibits a non-trivial relationship to unemployment, but it is not very sturdy in the presence of other occupational characteristics, and confined to unemployment of job losers. (The bias noted above might be expected to be stronger for quitters than for job losers, since those with low earnings due to transitory factors would have an incentive to quit.)

An alternative strategy is to assume (plausibly, I believe) that opportunities for advancement should lead, in most cases, to an individual remaining in his current industry. Industry-retention rates of occupations did prove consistently (negatively) related to unemployment, controlling both for personal characteristics and average wages of young workers in the occupation. The problem here is that an occupation's industry-retention rate is influenced by other factors besides opportunities for advancement. Indeed, any desirable job characteristic (apart from the wage, which is included separately) would be likely (other things equal) to reduce quits, quit-related unemployment, and industry-switching; whatever it is that reduces layoffs would also be likely to reduce layoff-related unemployment and layoff-induced industry switching.[14] One should not overstate the "automatic-ness" of these relationships, however: turnover and unemployment are not synonymous, and lack of opportunities for advancement would increase the likelihood that one would leave one job without having another line up.

To end on a more positive note, two conclusions do not seem warranted:(1) The industry retention rate is clearly measuring something which wages in the occupation and broad-occupation dummy variables do not. (2) While jobs in unionized firms may be desirable jobs for young workers for other reasons, improving access to these jobs is an unpromising approach to solving youth unemployment. Their greater layoff rates more than compensate for their lower quit rates.

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[14] A piece of information which supports this interpretation is the fact that a very high percentage of industry stayers are also firm stayers. Among out-of-school NLS young men, the percentages of industry stayers who were also firm stayers were 81.9% (1971 vs. 1966) and 86.3% (1973 vs. 1968).

References

Bartel, Ann P., and Borjas, George J., "Middle-Age Job Mobility: Its Determinants and Consequences," in Seymour L. Wolfbein, ed., Men in the Pre-Retirement Years (Philadelphia: Temple University School of Business Administration, 1977), pp. 39-96.

Bergmann, Barbara, "The Effect on White Incomes of Discrimination in Employment," Journal of Political Economy, vol. 79, no. 2, March/April 1971, pp. 294-313.

Feldstein, Martin, "The Economics of the New Unemployment," Public Interest, Fall 1973, pp. 3-42.

Feldstein, Martin, "The Effect of Unemployment Insurance on Temporary Layoff Unemployment," American Economic Review, vol. 68, no. 5, December 1978, pp. 834-845.

Gordon, David, Theories of Poverty and Underemployment (Lexington, Mass.: Lexington Books, 1972).

Hall, Robert E., "Why Is the Unemployment Rate So High at Full Employment," Brookings Papers on Economic Activity, 1970:3, pp. 396-410.

Landes, Elisabeth M., "Sex Differences in Wages and Employment: A Test of the Specific Capital Hypothesis," Economic Inquiry, vol. 15, no. 4, October 1977, pp. 523-538.

Leighton, Linda, "Unemployment over the Work History: Structure, Determinants, and Consequences," Ph.D. Thesis, Columbia University, 1978.

Marston, Steven T., "Employment Instability and High Unemployment," Brookings Papers on Economic Activity, 1976:1, pp. 169-210.

Mincer, Jacob, Schooling, Experience, and Earnings (New York: National Bureau of Economic Research, 1974).

Ornstein, Michael, Entry Into the American Labor Force (Baltimore: Center for Social Organization of Schools, 1971).

Piore, Michael, "The Dual Labor Market: Theory and Implications," in David Gordon, ed., Problems in Political Economy: An Urban Perspective (Lexington, Mass.: Lexington Books, 1971).

Rosen, Sherwin, "Learning and Experience in the Labor Market," Journal of Human Resources, vol. 7, no. 3, Summer 1972, pp. 326-342.

U.S. Census Bureau, 1970 Census of Population: Occupational Characteristics (Washington: U.S. Government Printing Office, 1973).

Youth Unemployment in Britain and the U. Component

Richard Layard

British unemployment differs markedly from U.S. unemployment in two ways:

1. Youth unemployment has been much lower relative to adult unemployment, for decades.
2. Spells of unemployment last on average about twice as long (at a given point of the cycle), with the difference being greater for adults.

There are also two points of similarity:

3. In both countries youth unemployment rises relative to adult unemployment in slumps.
4. And in both countries the demand for young workers is very sensitive to wage levels.

In the four sections of the paper I examine these phenomena.

Why is youth unemployment relatively low in Britain? It seems likely that both equilibrium and disequilibrium factors are involved (see Section 1). An equilibrium approach to unemployment leads one to look mainly for supply-side factors which might affect the choice of whether to be 'unemployed', rather than employed. I find good evidence that the higher relative youth unemployment in the U.S. reflects in part higher U.S. incomes, which also explain the remarkably low U.S. levels of labour-force participation, compared with Britain. Supply behaviour is also influenced by price effects: income maintenance for adults is less generous in the U.S. than in Britain and this tends to reduce the relative unemployment of adults. Another price effect in supply comes from the rigidity of the British labour market, which refuses admission to apprenticeship programmes to most people over the age of 16; this provides a strong incentive for youths to be employed.

I next explore whether differential disequilibrium can help to explain higher relative youth employment in the States. The obvious influence here is the minimum wage law, which does not exist in Britain. Though there is some non-compliance, it seems probable that the minimum wage has contributed to youth unemployment in the U.S. But the structure of age-wage profiles does not reveal any sharp differences between the countries.

Finally there is an important difference in information. Almost every school-leaver in Britain is interviewed by the Careers Service before leaving school and nearly a quarter find their first job through the Service. By contrast in the U.S. the state plays little more role in the placement of youths than in the placement of adults.

All the factors I have mentioned probably affect the relative rates of unemployment in the different age groups, though I cannot say by how much. Going on, one would like to be able to assess the efficiency cost of the unemployment in each age group and the impact of unemployment upon inequality. To do this one needs to look at duration (see Section 2). If unemployment arises from disequilibrium job-rationing, its cost (relative to the gross output lost) is approximately proportional to the average duration of the uncompleted spells.

Taking all age groups at a given point in the cycle, average durations are about twice as high in Britain as in the U.S. And the average number of spells per year among those experiencing any unemployment has been about the same. Thus, even though average levels of unemployment have been higher in the U.S. than in Britain, the efficiency cost (relative to GNP) has been lower. Furthermore, annual unemployment has been more evenly distributed across people.

As between youths and adults, the higher relative rate of youth unemployment in the U.S. turns out to be mainly due to higher relative durations. Thus the share of youth unemployment in the total efficiency cost of unemployment may be higher in the U.S. On the other hand the less generous scales of unemployment benefit may mean that adults suffer more when they are unemployed than youths do. Thus while the British worry particularly about youth unemployment (and now about long-term adult unemployment), the Americans may be right to worry particularly about adult male unemployment. However the British experience

1. Why is relative youth unemployment higher in the U.S.?

The puzzle

In the U.S., unemployment rates for young people are much higher relative to rates for adults than they are in Britain. There are various ways of looking at this. A crude way is to examine the unemployment rate of, say, all the under 25s relative to the unemployment rate of the over 25s. For a meaningful comparison one should probably exclude students, since in Britain full-time students do not generally work (except in vacations) and, even if they do, they are not included in labour force statistics (except in vacations).[1] In Britain survey-based unemployment data are only collected at Censuses,[2] when the form of question and methods of data collection are very similar for both countries. Table 1 shows the latest Census data. For males the youth rate is nearly twice as high (relative to the adult rate) in the U.S. as in Britain. There is less difference for women, but still some.

However, these differences could be misleading. For the U.S. labour force aged under 25 is much more recently out of school than the British labour force under 25; so one might expect that fewer of its members would have been absorbed into employment. However by the same reasoning one would expect that the proportion of the total unemployed who were under 25 would be much smaller in the U.S. than in Britain.[3] But in fact the proportions are very similar, although the proportions of the labour force who are under 25 are wildly dissimilar:

	Men		Women	
	Britain (1971)	U.S.A. (1970)	Britain (1971)	U.S.A. (1970
% of unemployed aged under 25⁺	31	30	34	31
% of labour force aged under 25⁺	20	11	25	19

⁺Excluding students.

does suggest that a good case can be made for a Careers Service for youth. Feldstein argued some years ago that the U.S. should have such a service. Given the market failures that arise in the presence of asymmetrical information, there does seem to be a case for this proposal.

Next there is the question of the time-series behaviour of youth unemployment rates (see Section 3). In Britain, as in the U.S., the age-structure of unemployment rates can be well explained by the state of the cycle, by relative youth earnings and by demographic factors. However in the late 1970s youth unemployment has been much higher in Britain than ever before. This phenomenon has led to endless speculation about structural change. But in fact it is due almost entirely to cyclical factors. In addition the size of the youth cohort has increased, as have relative youth earnings. These three factors taken together tend, if anything, to overpredict recent levels of youth unemployment. There is no clear evidence that Britain is engaged in a secular movement towards the American pattern of age-specific unemployment rates.

Across towns, the level of youth unemployment varies with the level of adult unemployment, in Britain as in America. But, as one might expect, the elasticity of youth unemployment with respect to adult unemployment is much less in the cross-section (0.6) than in the time series (1.4). Across towns, the ratio of youth unemployment to adult unemployment falls as adult unemployment rises.

Finally, in Section 4, I confirm that it is reasonable to find wage effects on youth unemployment, by looking at the effect of wages on youth employment. I estimate the demand system derived from the trans-log cost function on time series data for British manufacturing (April and October 1949-69). Holding constant output and capital, the own wage elasticity of demand is around -1.3 for youths, -1.6 for women and -0.3 for girls and men. Thus, if there must be minimum wages, the case for a separate youth rate seems overwhelming.

A further way of checking the point is to compare the unemployment rates of people with similar periods of experience since leaving school. This comparison can be made in Table 2.[4] For example, if one wants to compare British youth with U.S. whites /US(W)/, one notes that a half of 16-year-olds in Britain were out of school, as were a half of 19-year-old U.S. whites; and in each case about one-third had left school in the last year. If we now compare the unemployment rates of these groups for males, we find they were 8.8% in Britain and 11.2% for U.S. whites. By contrast the adult unemployment rates (age 30-34) were in the opposite order: 3.9% in Britain and only 2.6% for U.S. whites.

For women the difference in age-profiles between Britain and the U.S. is less striking. This may be because the concept of unemployment is more slippery for adult women than for any other group. In any case there are no comprehensive data on female unemployment in Britain except at Census years, so I shall henceforth confine my remarks to men. For unemployed men the regular data come from registrations at unemployment exchanges (most unemployed men register). These data show that at any point in the cycle the youth unemployment rates are lower relative to the adult rate than they are in the U.S. (see Tables 3 and 4).

In passing one should note the profound implications of this for the comparison of aggregate unemployment rates between Britain and the U.S. The normal assertion is that the British rate of registered unemployed needs to be raised by a fifth or less to allow for unregistered female unemployment and thus to get it onto a 'survey basis' comparable with the U.S. rate.[5] This comparison always makes the U.S. rate look awfully high. For example in 1976 the BLS estimate that British unemployment adjusted to U.S. concepts was 6.4 per cent, compared with the published British figure of 5.6 per cent and the U.S. figure of 7.7 per cent. Thus the U.S. rate is still 1.3 per cent higher. But at the same time the prime age male rate (ages 25-54) was about 0.8 per cent lower in the U.S. than in Britain.[6] In fact it seems likely that in every year in the 1970s except 1976 the U.S. prime-age male rate was below the British. It is therefore well to remember how much the aggregate U.S. rate is boosted not only by the relatively high rate of female unemployment but also by the relatively high rate of youth unemployment.[7]

The question is why the youth rates should be so much higher (relative to adult rates) than in Britain? At least five possible stories come to mind.

(i) Income effects in labour supply

The U.S. is a richer society. To investigate the effects of income I shall begin by looking at labour force participation. Participation rates are dramatically lower at all ages in the U.S. (except among the old) - see Table 2 for the under 35s and Table 5 for the over 35s. Whereas virtually all British males who are not incapacitated participate, the number of U.S. males not in the labour force is greater at every age than the number who are unemployed. (This has been true in most years, except for the those aged 25-34 in a few recent years.)

If income accounts for this difference between the two countries, it should also have produced a decline in age-specific participation rates over time within the U.S., which we do indeed observe. It should also lead to lower participation rates in higher income groups, which we again observe for adults. But for youths, cross-sectional data show the reverse pattern. I believe that this can be explained by the role of job-rationing in the youth labour market. Suppose that family connections have an important effect on a teenager's ability to find a job, and thus in turn on his willingness to participate. If family connections can be represented by income relative to the mean $(y/\bar{y})$ then the probability of participation might be approximated by some function such as

$$p = f\left[y^{-\alpha}\left(\frac{y}{\bar{y}}\right)^{\beta}\right] \qquad f' > 0$$

If $1 > \beta - \alpha > 0$, we should observe

(a) that in a cross-section high income youths participated more than low income youths and

(b) that over time and across countries, participation fell as average income rose.

However our main concern is with the participation rate of youths relative to adults. This is much lower in America than in Britain (where it is roughly unity).[8] Can this be explained by income levels? It seems quite likely. For over time youth participation rates (of non-students) have fallen by a greater proportion than adult participation rates.[9] Thus it may well be that higher income leads to disproportionate reduction in working-time at the beginning of life. Otherwise, it is difficult to explain why so many American parents are willing to support children who are not even looking for work.[10] It is hard to imagine such a phenomenon occurring in a much poorer country.

Turning to unemployment, we again find that the unemployment rate of youths relative to adults has an upward trend in the U.S. This is consistent with the notion that the U.S./British difference may be partly a function of the difference in income levels.[11] However the story is much more complicated than this and, while arguing that income effects are a part of the story, I now turn to other possible explanations.[12]

(ii) Price effects in labour supply: social security

Does social security help to explain the lower relative unemployment of adults in the U.S.? Quite possibly. For adults the key variable is net income out of work relative to net income in work. This is much lower in the U.S. than in Britain. In Britain the average male replacement ratio is .75 for all those currently unemployed and .69 for those currently employed.[13] In the U.S. the only data I can find are Feldstein's, which relate to individuals aged 25 to 55 excluding labour force entrants and re-entrants.[14] Nearly all of these were entitled to UI, which would not be true of many younger people nor of many labour force entrants and re-entrants. Yet even for the relatively 'privileged' group the average replacement ratio was .59 for the unemployed and .55 for the population as a whole. Thus the U.S. system is less generous than the British system to the adult unemployed.[15]

But the U.S. system is also of course less generous to youths (see Annex 1). However, for youths it is not the income replacement ratio that matters. What matters is the consumption "replacement ratio", and, given the indulgence of American parents, this may be quite high.[16]

Thus the lower adult income replacement ratios in the U.S. are probably an important reason for relatively high youth unemployment rates. But it is sometimes suggested that in addition Aid to Families with Dependent Children (AFDC) claimed by the family head raises relative youth rates. The argument is this. In Britain a child not in school is treated as an independent economic unit, even if living with the family. Thus the income received by a single parent mother with dependent children will be independent of the work behaviour of the older child. The fact that she is subsidized will have an income effect on the youth's behaviour, but that is all. In the U.S., however, a single-parent mother on AFDC has her AFDC income reduced (at a 2/3 marginal tax rate) for any income earned by a child who contributes to the family expenses. This would set up a substitution effect against the child working,as well as an income effect. Moreover, if AFDC is lost due to excessive family earnings, the family also loses its Medicaid entitlement. However, one would expect the mother would normally say the youth did not contribute to family expenses.[17] In this case AFDC sets up a substitution effect in favour of the child's working, since the parent's earnings are taxed, the child's are not, and the child's and parent's leisure must be substitutes.

In any case, the data show clearly that welfare is not a major part of the teenage unemployment story. For in families where the head is not on welfare the ratio of unemployment to employment is 97 per cent of the overall ratio (including those on welfare); for blacks the comparable figure is 88 per cent.[18] I conclude that AFDC does not explain the high relative youth unemployment rate, but the lower level of adult benefits may help to explain the low relative level of U.S. adult unemployment.

(iii) Price effects in labour supply: age limits for apprenticeship

Labour supply is affected not only by the cost of being unemployed, but by the returns to being employed. For many British teenagers these returns are very high. To become a skilled worker you still generally have to serve an apprenticeship, and most apprenticeships have to be entered at the age of 16. Thus, the discounted cost of not getting a job at 16 is very high. This helps to explain low unemployment rates and high participation rates for young males. It does not apply to young women, few of whom become apprentices. This may explain why the U.S./British age-profiles of unemployment differ more for men than for women (see Table 1).

In the more flexible U.S. situation the youth market is less separated off and less institutionalised than in Britain. It may be disadvantageous to be in a somewhat separated market in the face of business cycle variations in demand, but it may be an advantage to be separated, when it comes to the effect of exogenous increases in youth wages. This brings me to the question of the minimum wage.

(iv) Price effects in labour demand

The U.S. has statutory minimum wages (identical for young and old) now covering most of the labour force. Britain only has statutory minima in a few industries (mainly retailing and catering), though most other wages are covered by collective bargaining, which may also introduce rigidities into the structure.[19] However, in both statutory sectors and those covered by bargaining, youths and girls have special rates that are lower than those for adults.

It is difficult to draw any conclusions about the effects of minimum wages on relative youth unemployment by comparing the slope of British and American age-wage profiles, since so many cetera are not para. However, Table 6 shows hourly earnings for manual workers of each age relative to the average for all ages. This does not suggest that on average American youths are relatively overpaid. As a further check, Table 7 shows the average weekly earnings of youth relative to the all-age average. The median age of U.S. non-student workers aged under 25 is about 22, and British workers with comparable work experience are aged about 19. Again it does not seem that young U.S. workers have higher relative pay than young British workers.[20]

But of course there is always the problem that we never observe the wage that would have been paid to those who do not get employed. The same problem arises when we look at the relation between the distribution of youth wages and the minimum wage. According to Ashenfelter and Smith, in the covered sector the proportion of workers aged 17-19 paid the Federal minimum wage or less was only 8 per cent in 1973 and 12 per cent in 1975.[21] The proportion in the uncovered sector was about one half in 1973, but this sector was small. Thus the fraction of employed workers who would have been paid less than the minimum wage is not enormous; and, in addition, for employed workers the minimum wage is not paid in about a third of such cases. However, against this we have not allowed for the possible employment effects of the minimum wage, which could have ejected many low wage workers from the population being observed. It is therefore interesting to compare the shape of the British and U.S. wage distributions for young people, to see whether the U.S. distribution looks as though it is missing its lower tail. For males, the lower quartile was about 80 per cent of the median for both U.S. whites aged 16-19 and for British youths aged under 18 and 18-20,[22] providing no evidence of a reduced lower tail in the U.S. Unfortunately the published figures do not permit a similar calculation for U.S. blacks. Given the good time series evidence for the effect of minimum wages on youth employment and unemployment (Welch, Mincer), I am inclined to conclude that minimum wages may contribute a little toward the higher rates of white youth unemployment in the U.S. and a lot to the higher still rates of black youth unemployment.

(v) The British Careers Service

Finally, we consider an important institutional feature of the British youth labour market: the Careers Service. About 97 per cent of school leavers register with the Careers Service.[23] Most of them are interviewed by a Careers Officer while they are in school and about a quarter get their first job through the Service. The state apparatus makes much more effort to find jobs for school leavers than it does for adults.

The following shows the process by which school leavers find jobs. Each year over 650,000 youngsters leave school aged under 18, most of them in June and July. The number who had still not found jobs is as follows (thousands)[24]

	1973	1974	1975	1976	1977	1978
September	13	33	118	142	166	131
October	5	13	65	78	93	76
November	2	8	40	N.K.	69	53
December	2	N.K.	32	48	54	40

(I have not been able to find similar data for the U.S.) Since the school-leaving age was raised to 16 (with effect from 1973), the vast majority of all school-leavers have been leaving at the age of 16. Yet the unemployment rate has been hardly any higher for people aged 16-17 than for those aged 18-19 or 20-24 (see Table 3). This suggests a relatively successful initial absorption of school leavers, but considerable problems arising after the first job is over.

2. Duration as an indicator of the cost and distribution of unemployment

We have not so far compared the economic cost of unemployment in Britain and the U.S. To assess the economic cost of a given stock of unemployment one needs to know how long it has lasted. The key statistic is the distribution of those currently unemployed by the length of time they have been unemployed to date (i.e. the distribution of "interrupted spells"). Since this is not universally agreed, I should perhaps first justify this focus on interrupted spells.

It seems reasonable to suppose that the value of additional leisure varies with the amount of leisure already experienced. Thus if we want to cost the unemployment experienced in a particular week we look at the amount of unemployment already experienced by the unemployed. If a person could produce W per week (gross) and values his t^{th} week's leisure at V_t, then the economic cost of the t^{th} week of unemployment is

$$C_t = W - V_t$$

Thus the total cost of unemployment per week is

$$\sum_{t=1}^{\infty} N_t C_t = N . \left[\sum_{t=1}^{\infty} \frac{N_t}{N} . C_t \right] \qquad (1)$$

where N_t are the numbers with t weeks unemployment experience and $N = \Sigma N_t$.[25] The significance of a given stock of unemployment (N) thus depends on the distribution of the uninterrupted durations (N_t/N).

This applies equally in a steady or a non-steady state. However for those who are naturally inclined to think of unemployment in terms of flows, there is of course an analogous expression which shows how in a steady state the significance of a given flow of unemployment (F) depends on the distribution of completed durations. Suppose F is the flow per period of entrants whose completed duration will be d periods, and T_d is the total cost of a completed spell lasting d weeks. Then the total cost per week in a steady state is

$$\sum_{d=1}^{\infty} F_d \, T_d = F.\left(\sum_{t=1}^{\infty} \frac{F_d}{F} \, . \, T_d\right) \qquad (2)$$

where $F = \Sigma F_d$. However most members of the public (and even most academics) have no idea what the flow into unemployment is, and it seems much better to focus on the average cost of the stock of unemployment rather than of the flow.[26]

To measure this average cost it is probably sufficient to concentrate on the mean spell length, at any rate on the assumption that unemployment is involuntary. For then, in the case of a person who has been unemployed so far for t weeks and who is normally paid his marginal product[27]

$$C_t = W - V_t = \frac{t}{52\,\varepsilon} W$$

when ε is the compensated elasticity of supply of annual weeks. The total cost relative to potential labour earnings is

$$u \, \frac{(\overline{tW})_U}{52\,\varepsilon} \; \frac{1}{\bar{W}_T}$$

where u is the unemployment rate, U relates to the unemployed and T to the total labour force. If duration and wages are independent, this reduces to

$$u\bar{t}\left(\frac{1}{52\,\varepsilon} \; \frac{\bar{W}_U}{\bar{W}_T}\right)$$

Thus assuming the term in brackets to be similar in the U.S. and Britain, $u\bar{t}$ is a good index of the cost of unemployment relative to potential earnings.

This index is shown in Table 8. Since duration in Britain is generally twice as large as in the U.S. (at a similar point in the cycle), the relative cost is higher even though the rates are generally lower. This is why people worry about unemployment more in Britain.

Another possible reason for being interested in the mean uncompleted duration is that it is also equal to the mean time which those currently unemployed will remain unemployed from now on.[28] The length of the uncompleted duration may thus give some idea of the plausibility of viewing workers as engaged in search rather than (as we have hitherto assumed) as being rationed. There certainly appears to be more search unemployment in the U.S. than in Britain.

Of course if a given stock of unemployment is associated with a longer duration, this means not only that it is more costly but also that it is more unequally distributed. Fewer people will be experiencing more unemployment (if we ignore for the time being the problem of repeated spells). Table 9 gives some relevant figures, for all age groups combined.[29] We find for 1972-77 an average male completed duration of about 7 weeks in the U.S. and 13 weeks in Britain, with corresponding differences in probability of an individual's becoming unemployed. These differences are consistent with the picture of a more mobile society in which all durations are shorter (job tenure, housing tenure, marital tenure). For example the monthly turnover rate in manufacturing in 1977 was 3.8 in the U.S. and 2.1 in Britain.[30] However in addition the shorter duration may be due to the fact that UI normally expires after some months. Public assistance may then be available at a much lower rate. In Britain social security is in effect paid indefinitely, though at a lower rate after the first 26 weeks and a slightly lower average rate after a year.

This reminds us that duration, though it may be the main determinant of the efficiency cost of a given unemployment rate, is not the only thing affecting the distributional consequences of unemployment. The social security system is probably more important. In the U.S., income out of work is lower relative to income in work than in Britain. Thus the disequalizing effect of unemployment is probably at least as high in the U.S. as in Britain. But it is relatively greater for adults than for youths, so far as consumption is concerned. Thus it is not obvious in the U.S. that there is any greater equity case for measures to relieve youth unemployment than adult unemployment. In fact it is possible that the relative absence of measures to combat youth unemployment in the U.S., compared with Europe, can be explained by the comparatively low levels of income maintenance for adults in the U.S.

However there is one obvious qualification to be made to all of the preceding: the problem of repeated spells. If leisure in every week of one's life was a perfect substitute for leisure in every other period, the efficiency cost of unemployment would depend on the amount of unemployment that each individual had had so far over his whole life. And the fairness with which unemployment was distributed would depend on the distribution of lifetime unemployment. But leisure in more closely adjacent weeks is in fact more closely substitutable than leisure in weeks more widely separated. So we could think of the efficiency cost as depending on the distribution of unemployment accumulated over a year, and equity also as depending on the distribution of annual unemployment. A key statistic is therefore the amount of repetition. Are the short U.S. durations associated with more repetition? Apparently not. Unfortunately the only British data are available for 1971/2 (the highest post-war unemployment year before the oil price rise). In that year the average number of spells per unemployed person was 1.8 - almost the same as in the U.S. in 1975, 1976 and 1977 (see Table 10). In both countries the average number of spells was almost the same for young people as for the population at large.[31]

Finally we can return to the basic question of Section 1 and ask whether the higher youth unemployment (relative to adults) is due to higher relative flow or to higher relative duration. In Table 11 the British duration figures (for January) overstate the relative duration of teenagers on an all-year basis (see Table 12). It follows that the durations of youths in the U.S. are definitely higher relative to adults than they are in Britain. And indeed for people aged 20-24 differences of duration alone seem to explain the higher relative unemployment rate. For teenagers there is in addition a disproportionately high inflow into unemployment in the U.S., but this must be largely due to the high proportion of teenagers who have recently left school.[32]

3. British time-series and cross-section analysis of youth unemployment[33]

In Britain youth unemployment has risen much more sharply relative to adult unemployment than in the U.S. Present ratios of youth to adult unemployment are totally without post-war precedent. But so is the level of adult unemployment (see Table 4 and Chart 1).[34] By contrast in the U.S. recent high levels of unemployment are less without precedent, and have proved shorter-lived. However it seems that similar mechanisms explain the time series (and cross-sectional) variation of youth unemployment in the two countries. Other things equal, one would expect the youth unemployment rates to reflect (a) disequilibrium forces and (b) equilibrium forces, of the kinds discussed in Section 1. Disequilibrium corresponds to the difference between effective supply and demand. One would expect that the demand for each type of labour would depend on output and on relative wages. Short-run changes in labour demand would not necessarily be proportional to changes in output. In fact one would expect the demand for youth to be more responsive to the business cycle than the demand for adults, for two reasons. First, the simplest adjustment to a change in labour demand is to stop hiring, and hirings include a disproportionate number of youths. Second, the wages of youths include a higher fraction of capital expenditure than the wages of adults, and firms are averse to capital expenditure during slumps. Thus one could write the demand for youths relative to adults as

$$\frac{DY}{DA} = f(CYC,\ WY/WA)$$

where CYC indicates the cycle and WY/WA the wage of youths relative to adults. Building on this, one could approximate the unemployment rate of teenagers relative to adults (non-teenagers) by

$$\ln\left(\frac{UY}{UA}\right) = a_0 + a_1\ CYC + a_2 \ln\left(\frac{WY}{WA}\right) + a_3 \ln\left(\frac{SY}{SA}\right) \qquad (3)$$

where SY/SA are the relative labour supplies.[35]

In addition equilibrium forces should be at work. Relative income support levels for the two groups should be important, but the Supplementary Benefit for a youth relative to an adult rarely had a t-value above unity. Equation (3) is therefore our estimating equation. The analysis is confined to males, since the rate of registered unemployment of adult females is particularly difficult to interpret.

Before presenting the results we must briefly discuss the explanatory variables, and their movement over time.

(i) The cycle (VAC or UA)

This is probably best measured by the number of vacancies registered at employment exchanges (VAC). Alternatively it can be measured by the adult male unemployment rate (UA), but we are then explaining youth unemployment by adult unemployment which is a highly trended variable, whose significance has probably altered over time. Vacancies are relatively untrended but have almost identical turning points to adult unemployment (up to 1976).

(ii) Relative wage rates (RY/RA)

The hourly earnings of men under 21 relative to those over 21 are shown in Chart 2. Relative youth earnings rose steadily up till 1972. Then in 1973 they shot up, and have continued shooting up since. The main explanation seems fairly clear. The compulsory minimum school-leaving age was raised from 15 to 16 for everyone becoming 15 after September 1972. About two-thirds of children were forced to stay an extra year at school. This of course had a profound effect on the quality of the teenage labour force. In the first place it removed from the labour force all people with schooling up to age 15 and no work experience. But in addition in the higher age groups (16, 17, 18, and 19) people who had left school at 15 were progressively replaced by people who had left at 16 (beginning in 1974 and ending in 1977). Thus the efficiency units per teenager increased. Suppose we treat a 15-year-old leaver with no work experience as

1 erg, and assume that 1 year of work-experience and 1 year of schooling each add 0.1 ergs in an additive fashion. Then the number of ergs per teenager in a steady state changed as follows.[36]

	Ergs per teenage worker	Teenage ergs at work if population constant (1972 = 6.0)
1972	1.20	6.0
1973	1.25	5.0
1974	1.275	5.1
1975	1.30	5.2
1976	1.3275	5.3
1977	1.35	5.4

So one would expect some rise in relative teenage wages, but not by as much as the 16 per cent which occurred. If we standardise earnings to allow for the above changes in ergs per teenager, we get the dotted line shown in Chart 2. This (which is the variable we use) continues the trend rise in earnings observed before 1972.

Why these relative earnings have risen is not clear. If the earnings changes was due to changes in the balance of supply and demand, then one could hardly use them to explain movements in unemployment. However this does not seem to be the case. Let us begin with the period since 1972. Due to the raising of the school-leaving age there would of course have been a reduction in the number of teenage ergs at work (relative to adults) if population structure had remained constant. However, as Chart 3 shows, the teenage population rose between 1972 and 1976 by 10 per cent - just enough by that date to offset the effect of the raised school leaving age on the number of teenage ergs as recorded above. Moreover a raised school leaving age would not create much marked shortage of youth at existing wages if people in their younger 20s were good substitutes for teenagers. Given that there must be a good deal of substitution, I am willing to accept the conventional view that youth wages have risen due to an unexplained tendency in collectively-bargained wage agreements

There is also the puzzle of the rise in relative youth earnings before 1972. Could this be due to quality improvement? During the period, the proportion of youngsters who stayed on rose continuously. This staying-on, if independent of ability levels, would raise quality, whether the extra staying-on was voluntary or compulsory. However the voluntary staying-on was in fact selective. So the average 'natural ability' of the teenage work-force declined, as the abler people reduced the fraction of their teenage years spent in the labour force more rapidly than the less able people did. One cannot quanitify this effect, but there seems no obvious reason to reject the null hypothesis that the quality of the teenage work force remained constant relative to the adult work force (which was itself improving in quality). Thus one would expect the series in Chart 2 (including the dotted section) to help to explain relative teenage unemployment. Further confirmation of the power of this series to explain the teenage employment is provided in Section 4.

(iii) Relative labour supply (POPY/POPA)

There are two possible ways of measuring demographic movements:

(a) the fraction of the total population aged 15-60 who are aged 15-19 (POPY/POPA), shown in Chart 3;

(b) the fraction of the total labour force aged 15-19.[38]

The second of these appears to reflect more accurately the labour supply of teenagers, but is subject to two drawbacks. First, if teenage labour supply is reduced (for example by the raising of the school-leaving age) one would not necessarily expect less teenage unemployment if people in their early 20s are close substitutes for teenagers. In fact the youth labour market may be better considered as a market for people in their first five years of work experience. In such a case variable (i) is more relevant.[39] Second, labour supply may respond to unemployment, whereas population is exogenous. I therefore use variable (i).

One must of course remember that over time the teenage labour force (whose unemployment we are studying) has got increasingly close to the time when it left school. This means that its members have had less time for a successful job-search and job-matching. One might suppose this would have produced an upward trend in relative youth unemployment, but no such trend appears in the regressions. However, as Table 3 shows the youth unemployment problem is not primarily one of initial absorption, so this may not be an especially important aspect of the situation.

Turning to the results, these are estimated on annual data (males only). As Table 13 shows, the effect of the cycle is transparent. The youth unemployment rate goes up relative to the adult unemployment rate during a slump. In fact it rises 40 per cent faster than the adult unemployment. Given that the youth unemployment rate is on average over the period close to the adult rate, it follows that youth employment falls in a slump faster than adult employment falls. The estimated effect is robust with respect to the other included variables, but falls as the sample period is extended forwards. This is because youth unemployment in 1976 was much lower than predicted by any equation. For example Chart 4 shows the remarkable tracking power of the top equation in Table 13 but also shows how it overpredicts in 1976. Since all our exploratory variables have high values in 1976, their estimated coefficients all fall when that year is included.

The estimated effect of relative wages seems to vary in addition according to how demand is specified, though it is always positive and reasonably significant. If, as I prefer, demand is measured by vacancies, the effect of relative wages is very large - with an elasticity of 4-5. In this case relative wages are being made to explain most of the time trend in UY/UA. If, instead, adult unemployment is the explanatory variable, then it itself picks up a part of the time trend in UY/UA. By contrast, the effect of population size is unaffected by which demand variable is included.

One can therefore conclude that there is nothing surprising about recent high levels of youth unemployment. The world is still the same, except that we are in a protracted slump.

Cross-section of towns

It is interesting to compare the time-series relation between youth and adult unemployment with the cross-sectional relation. In a cross-section of towns, one would expect the youth unemployment rate to vary positively with the adult unemployment rate. But one would also expect the elasticity of the youth rate with respect to the adult rate to be lower in the cross-section than in the time-series. For over time youths are not hired in a downturn, whereas in a 'steady state' it is not obvious that a bad economic climate would affect youths more than adults. Indeed, since youths can more readily migrate, one might expect the youth rates (for the current work force) to vary less than the adult rate. One cannot of course claim that the 1971 data for 78 county boroughs (towns) represented a completely 'steady state', however defined. Even so, the cross-sectional structure of unemployment rates has been fairly stable.

The data support our prediction: the cross-section elasticity of the youth rate with respect to the adult rate is only .6, compared with 1.4 for the time-series. The exact estimate is (s.e. in brackets)

$$\ln UY = 1.19 + \underset{(.06)}{.61} \ln UA \qquad R^2 = 0.61$$

where youths are teenage men as before and adults are men aged 25-59. Adding as a variable the relative supply of youths does not appear to add significantly to the explanatory power of the equation.

4. Time-series analysis of the demand for labour by age in British manufacturing

Finally we can examine whether wage movements are a plausible explanation of relative unemployment rates, by looking at the effect of relative wages on the age composition of employment (rather than unemployment). The only available data on labour demand by age in Britain relate to manual workers in manufacturing, which I take to be a price-taking sector. I use the data for April and October in the years 1949-1969. These are shown in Charts 5 - 8, together with once-yearly data for 1970-1976.

The Charts 5A - 8A show the man-hours of youths, girls, full-time women and part-time women, all measured relative to the man-hours of men. Charts 5B - 8B show the hourly wages of each type of labour relative to the hourly wages of men. Taking youths first, there was an increase in relative employment lasting into the 1960s, followed by a relative decline that began well before the raising of the school-leaving age in 1972. By contrast the relative wage rose more or less continuously, as we have already seen. The relative number of girls employed (always smaller than the number of boys) fell more or less continuously, indicating that the rise in the number of boys in the mid-60s cannot be simply explained by the rise in the number of young people in the labour force resulting from the post-War baby boom. The relative wage of girls was more or less flat until its recent surge, which was affected by the forces already mentioned plus equal pay legislation for females. The relative employment of women has fallen more or less continuously, with the rise in part-time women-hours insufficient to compensate for the fall in full-time women-hours. Relative wages of women were more or less flat until a recent spurt, partly due to equal pay legislation.

To assess the effect of wages on labour demand requires a fully-specified demand system. The most tractable general demand system is that derived from the translog cost function. In using this I shall not attempt to explain the pattern of investment and will therefore take the capital stock as a predetermined variable (K) affecting labour costs (C). The general cost function can then be written as

$$\ln C = f(\ln P_1, \ldots, \ln P_n, \ln K, T, \ln Y)$$

where P_i is the price of the i^{th} type of labour, T is time and Y is output. Taking a Taylor series expansion around zero values of all right-hand variables, we get

$$\begin{aligned} \ln C = a_0 &+ \Sigma g_i \ln Pi + g_K \ln K + g_T T + g_Y \ln Y + \tfrac{1}{2}\Sigma\Sigma d_{ij} \ln P_i \ln P_j \\ &+ \tfrac{1}{2}d_{KK} (\ln K)^2 + \tfrac{1}{2}d_{TT}T^2 + \tfrac{1}{2}d_{YY} (\ln Y)^2 + \Sigma d_{iK} \ln P_i \ln K + \Sigma d_{iT} \ln P_i . T \\ &+ \Sigma d_{iY} \ln P_i \ln Y + d_{KT} \ln K. \; T + d_{KY} \ln K \ln Y + d_{TY} T \ln Y. \end{aligned}$$

where

$$d_{ij} = \left. \frac{\partial^2 \ln C}{\partial \ln P_i \partial \ln P_j} \right|_0 = d_{ji}$$

Since $\frac{\partial C}{\partial P_i} = x_i$, $\frac{\partial \ln C}{\partial \ln P_i} = \frac{x_i P_i}{C}$

or the share of the i^{th} factor in total labour cost (C). Hence, differentiating lnC by lnPi we find that

$$\frac{x_i P_i}{C} = g_i + \sum_j d_{ij} \ln P_j + d_{iK} \ln K + d_{iT}T + d_{iY} \ln Y \quad \ldots (i = 1, \ldots, n) . \tag{4}$$

In addition

$$\frac{\partial \ln C}{\partial \ln K} = g_K + \Sigma d_{iK} \ln P_i + d_{KK} \ln K + d_{KT}T + d_{KY} \ln Y \tag{5}$$

and $$\frac{\partial \ln C}{\partial T} = g_T + \Sigma d_{iT} \ln P_i + d_{KT} \ln K + d_{TT}T + d_{TY} \ln Y \tag{6}$$

and $$\frac{\partial \ln C}{\partial \ln Y} = g_Y + \Sigma d_{iY} \ln P_i + d_{KY} \ln K + d_{TY}T + d_{YY} \ln Y \tag{7}$$

Since shares add to a constant (unity),

$$\sum_i d_{iK} = \sum_i d_{iT} = \sum_i d_{iY} = 0 \qquad (8)$$

Since shares do not vary when all prices change by a common multiple,

$$\sum_j d_{ij} = 0 \qquad \text{(all i)} \qquad (9)$$

One could estimate the preceding system as a whole, though this would require fairly strong assumptions about the value of $\frac{\partial \ln C}{\partial \ln K}$ which needs to be measurable for the estimation of equations (5) and (6).[40] Or one could confine oneself to the system (4), as I shall do. Using restriction (9) we find that[41]

$$\frac{x_i P_i}{C} = g_i + \sum_{j=1}^{n-1} d_{ij}(\ln P_j - \ln P_n) + d_{iK} \ln K + d_{iT} T + d_{iY} \ln Y$$

$$(i = 1, \ldots, n) \qquad (4')$$

where n is some factor taken as numeraire. In addition, since the shares must add up, one need only estimate (n-1) equations for (n-1) shares. This is our estimating system, with the requirement that $d_{ij} = d_{ji}$ imposed upon it. The Allen elasticities of substitution are then evaluated as[42]

$$S_{ii} = \frac{d_{ii}}{A_i^2} + 1 - \frac{1}{A_i}$$

$$S_{ij} = \frac{d_{ij}}{A_i A_j} + 1 \qquad (i \neq j)$$

where $A_i = \frac{x_i P_i}{C}$ evaluated at the mean. The price-elasticities of demand (with output and capital constant) are

$$e_{ij} = S_{ij} A_j$$

Estimates

System (1^1) was estimated using the TSP's iterative version of Zellners's minimum distance estimator (see Table 14).[43] The variables are defined in Annex ? Unfortunately we have no data on non-manual workers, so the assumption is that the relative demand for manual workers of different age and sex is independent of the number of non-manual workers. (Part-time women were amalgamated with full-timers in order to reduce the number of parameters.)[44] The results are fairly sensible and suggest quite high short-run elasticities of demand for youths (but not girls), linked to quite high substitutability between categories of labour (except, rather oddly, girls and women). Girls are very good substitutes for youths, and women are less good substitures. As one would expect, youths and girls are not good substitutes for men, women being rather better substitutes. These findings are similar to those of Anderson, and Freeman for the U.S.[45] None of the effects of capital, output or time were well-determined. But, given the significance of the price effects, one has some confidence in supposing that youth wages are highly relevant to the problem of youth unemployment.[46]

Annex 1

Income maintenance for young people

Income if unemployed as a fraction of income in full-time work is probably higher for youths relative to adults in Britain than in the U.S. A registered unemployed British youth, even if he or she has never worked and is living at home, can claim Supplementary Benefit. This is currently paid to someone living at home and aged 16 to 17 at a rate equal to about 30 per cent of gross male weekly earnings at that age (and a higher percentage of net earnings). With a minimal work record an 18-19 year old can claim unemployment benefit equal to about 30 per cent of the equivalent gross male earnings. About two-thirds of unemployed youths under 18 in Britain personally receive social security payments.[47]

In the U.S. it is more difficult for a youth to obtain benefit in his own right. Only 11% of unemployed under 20's (out of school and looking for full-time work) were on U.I. in May 1976. In some states other youths would be receiving personal welfare payments, but there is no information on the numbers.

Annex 2

Definitions of variables in Section 4

P	hourly earnings: from survey of Earnings and Hours of Manual Workers in Manufacturing, in April and October (to 1969) and October (1970 onwards).
X	manual manhours: from the same source
K	fixed assets in manufacturing. Gross value at constant prices (replacement cost). The series is rebased a number of times over the period and I have grafted one series onto the next.
T	time (1 unit = 6 months; April 1948 = 1)
Y	index of manufacturing production (this is a value-added measure)

FOOTNOTES

Footnote No.

1 Excluding students from the U.S. data also involves excluding part-time students, who are included in the British data. However the age-specific unemployment rates of students in the U.S. are very similar to those of non-students.

2 The General Household Survey is too small for disaggregated comparisons with the CPS.

3 This assumes that the age structure of the population is not totally dissimilar.

4 One should ignore the figure for unemployed 15-year-olds in Britain, since nearly all 15-year-olds in the labour force had left school a month before the Census.

5 See U.S. D.O.L., B.L.S., International Comparisons of Unemployment, Bulletin 1979, 1978, p.19.

6 A formula which would adjust the British aggregate rate so that in 1976

British aggregate adjusted rate - U.S. aggregate rate
= British prime male rate - U.S. prime male rate

would be to multiply the British aggregate rate by 1.5. The multiple would of course differ between years.

7 It is also 'boosted' by the inclusion of unemployed students (some 14 per cent of U.S. unemployed). Such people cannot be included when other countries are adjusted to U.S. concepts due to lack of data (and the absence of any large number of such people). Including them raises the U.S. rate by a multiple of between 1.05 and 1.10.

Footnote No.

8 In addition in 1970/1 of employed males under 20 not in school 21% in the U.S. worked part-time (under 35 hours) compared with under 7% in Britain. (There were few differences here for women.) However some of the part-timers may have been looking for full-time jobs. (Source: Britain, 1971 Census Economic Activity Table 23; U.S., As for Table 2).

9 ETRP 1978, p.242 and p.186-7.

10 C.P.S. analyses by D. Ellwood and M. Feldstein show that of males under 20 out of school and out of the labour force, only 37 per cent say they would definitely like a job, and of these only 37 per cent are not looking because they do not think they could find one. Of the whole group (males under 20 out of school and out of labour force) 28 per cent say they will not look for work in the next 12 months (or their intentions are so reported).

11 I would explain the fact that individual youth unemployment is negatively correlated with income by the same type of expression as used to explain individual youth participation in the labour force.

12 Not all differences found in cross-sectional data for individuals are found repeated in a comparison of U.S. and Britain.

(a) The hours of work of full-time workers are not lower in the U.S. (1977): for men 43 hours in Britain and 45 in the U.S., and for women 38 hours in Britain and 40 in the U.S. (see D.E. New Earnings Survey, 1977, p.A18-19 and B.L.S. Employment and Earnings, July 1978, vol. 25, No. 7, p.39).

(b) Female participation is higher in Britain than the U.S.

13 R. Layard, D. Piachaud and M. Stewart, The Causes of Poverty, Royal Commission on the Distribution of Income and Wealth, Background Paper No. 5, HMSO, 1978, and S.J. Nickell, 'The effect of unemployment and related benefits on the duration of unemployment', Economic Journal,

Footnote No.

14 M. Feldstein, 'The effect of unemployment insurance on temporary layoff unemployment', A.E.R. Dec. 1978.

15 The previous comparison is complicated by two factors. First, Feldstein's figures include women but he also shows a figure of .54 for the subsample of (predominantly male) union members. Second, his figures are individual income replacement ratios and ours are family income replacement ratios. On average women's earnings account for under one-fifth of family income so the British individual income replacement ratios for all males could not be as low as the U.S. ratios for 'privileged' males. (Most international comparative statistics on unemployment relief fail to mention the British Supplementary Benefit system which determines th income maintenance levels of 50% of the unemployed, compared with 30% whose income maintenance is determined by National Insurance).

16 A youth in a family characterized by an altruistic head does not face the full cost of his actions. If he decides his own labour force behaviour, he may make choices which do not maximize family income.

17 She is unlikely to say this if the youth is under 18. For if the youth is under 18, the AFDC entitlement includes a child allowance only payable (for a non-student) if the child is working or registered unemployed. This constitutes a strong pressure to participate (though not to take a job). But under a quarter of unemployed teenagers out of school are under 18.

18 1975 SIE analysis by R. Freeman. Data relate to 18-19 year-old males (including students?).

19 75 per cent of men are covered.

20 Another approach is to look at the shape of estimated experience-earning profiles. If male annual earnings are regressed on schooling, experience and experience squared, earnings at the peak are 280 per cent higher than starting earnings in Britain and 288 per cent higher in the U.S. (G. Psacharopoulos and R. Layard, 'Human capital and earnings: British evidence and a critique', Review of Economic Studies, forthcoming; J. Mincer, Schooling, Experience and Earnings, 1974.)

21 O. Ashenfelter and R. Smith, 'Compliance with the Minimum Wage Law', Industrial Relations Section, Princeton University, Working Paper 98, June 1977.

22 D.E. New Earnings Survey, 1977, Table 126. For U.S. as in Table 6.

23 Formerly known as the Youth Employment Service, this is run by local education authorities and has primary responsibility for the placement of school leavers. 22% of a random sample of 3,000 16-19 year-olds interviewed in November 1976 said they got their first job through the Careers Service (Manpower Services Commission, Young People and Work, Manpower Studies No. 19781, 1978).

24 D.E. Gazette regular statistics. Relate to number of school-leavers registered as unemployed. A 'school-leaver' is anyone under 18 who has never had a full-time job. From January 1961 to January 1975 the number of unemployed people under 18 who had not yet found a first job never rose above 10,000 in any January. In January 1976 it was 38,000.

25 I am assuming unemployment always lasts a whole number of weeks.

26 Expressions (1) and (2) are of course equivalent since

$$\sum_{d=1}^{\infty} F_d T_d = \sum_{d=1}^{\infty} \left(F_d \sum_{t=1}^{d} C_t \right)$$

$$= (F_1 C_1 + F_2(C_1 + C_2) + F_3(C_1 + C_2 + C_3) + \dots$$

$$= C_1(F_1 + F_2 + F_3 + \dots) + C_2(F_2 + F_3 + \dots) + C_3(F_3 + \dots) + \dots$$

$$= \Sigma\, C_t\, N_t$$

since $N_t = \sum_{d=t}^{\infty} F_d$.

27 This assumes no repeated spells in a year. If a worker's annual weeks are held to $|\Delta H|$ below their equilibrium level, the compensated supply price falls from W to V where

$$W - V = \frac{dW}{dH} |\Delta H|$$

Hence $W - V = \frac{dW.H}{dH.W} . \frac{|\Delta H|}{H} W = \frac{1}{\varepsilon} \frac{|\Delta H|}{H} W$

28 See S. Salant, 'Search theory and duration data: a theory of sorts , Q.J.E., 91, Feb. 1977, pp.39-57.

29 The U.S. duration figures are taken from Akerlof and Main since Clark and Summers' figures do not reflect short spells beginning and ending between CPS interviews. (The Clark and Summers' figures are 9.4 for 1974, and 11.3 for 1976, see K. Clark and L. Summers, Labour force transitions and unemployment, N.B.E.R., mimeo, April 1978.) However I rely on the Clark and Summers finding of almost identical durations for men and women in assuming that Akerlof and Main's figures for both sexes also apply to men.

30 ETRP 1978 p.275 and D.E. Gazette May 1978 p.577. It would be interesting to compare the distribution of establishments by their annual changes in employment, in order to see to what extent the labour turnover reflects demand-side as opposed to supply-side

30 (contd.) forces. British data are available — are there U.S. data? It would also help if the CPS would ask how unemployed re-entrants left/lost their last job (British data are available).

31 For Britain see S. Owen, 'Do the faces in the dole queue change?', University College, Cardiff, mimeo, Summer 1978. U.S. data are special tabulations relating to non-students and show average numbers of spells in 1977 of 1.83 for men aged 16-19 and 1.72 for men aged 20-24. Of course the distribution of cumulated spells depends not only on the frequency of repetition but on the way in which spell lengths differ for repeaters and others. I have not been able to investigate this for Britain (on the U.S. see Akerlof and Main).

32 In both countries of course the inflow of youths into unemployment is much higher than of adults, though, perhaps interestingly, the difference in Britain seems rather less than the differential turnover rate. The percentage of employees who have been with their current employer for less than 12 months is (April 1976)

	Under 18	18-20	21-24	25-29	30-39	40-49	50-59	All
Males	57	21	20	14	10	6	4	11
Females	60	25	21	16	15	9	5	16

(New Earnings Survey).

33 This whole section is based on data generously supplied by Peter Makeham of the Department of Employment from his forthcoming study of youth unemployment, summarised in D E Gazette, August 1978. Full details of the time-series sources are available in the Technical Annex to his article in the D.E. Gazette, August 1978, obtainable from the Department of Employment. The following

33 (contd.) definition is important. Unemployment rates are measured in July but exclude school leavers in order to avoid problems to do with changes in school-leaving dates. Adult students are also excluded. The cross-section data are based on the 1971 Census Table 18, unemployment rates being measured by total out of employment as percentage of all economically active.

34 The same has happened in France and Germany (see H. Gallis, Youth unemployment: a statistical analysis, EMP 47-1/WP 2, I.L.O. Oct. 1977).

35 Since UY and UA are small

$$\frac{UY}{UA} \simeq \ln\left(\frac{SY}{DY}\right) \Big/ \ln\left(\frac{SA}{DA}\right)$$

But in addition since UY/UA is not far from unity

$$\ln\left(\frac{UY}{UA}\right) \simeq \frac{UY}{UA} \simeq \ln\left(\frac{DA}{DY}\right) + \ln\left(\frac{SY}{SA}\right) \simeq f\left(\frac{WY}{WA}\right) + \ln\left(\frac{SY}{SA}\right)$$

with $f' > 0$.

36 This is based on the assumption that (nearly) all who do not leave at the minimum age stay till 19 or over. Unfortunately, no more subtle exercise is worthwhile since there is no fine breakdown of teenage wages by age, let alone by age and education. The best data are in the source to Table 6.

37 In so far as unemployment affected pay, I assume the relationship has a lag so that current pay is predetermined.

38 See for example D.E.G., April 1978, p.427.

39 It might be better still to measure the fraction aged (15 + D) to (19 + D) where D is unity from 1973 onwards and 0 before.

40 To estimate (6) we need a measure of $\frac{\partial \ln C}{\partial T}$, which can be measured using the following identity:

$$\frac{d\ln C}{dT} = \sum_i \frac{\partial \ln C}{\partial \ln P_i} \frac{d\ln Pi}{dT} + \frac{\partial \ln C}{\partial \ln K} \frac{d\ln K}{dT} + \frac{\partial \ln C}{\partial T} + \frac{\partial \ln C}{\partial \ln Y} \cdot \frac{d\ln Y}{dT}$$

One could assume on the basis of zero excess profits that

$$\frac{\partial \ln C}{\partial \ln K} = \frac{\partial C}{\partial K} \frac{K}{C} = \frac{rK}{C} = \frac{\Pi}{C} \text{ and } \frac{\partial \ln C}{\partial \ln Y} = 1 - \frac{\Pi}{C}.$$

Footnote No.

41 Constant returns requires

$$d_{iK} + d_{iY} = 0$$

But, as we are omitting non-manual workers from the demand system (for lack of information) there is no virtue in imposing this constraint.

42 See H. Binswanger, 'A cost function approach to the measurement of elasticities of factor demand and elasticities of substitution', American Journal of Agricultural Economics, May 1974.

43 To reduce the autocorrelation of residuals, the system was estimated as follows:

$$A_i = g_i + \Sigma d_{ij}(\ln P_j - \ln Pn) + d_{iK} \ln K + d_{iT} \cdot T$$

$$- \rho(g_i + \Sigma d_{ij}(\ln P_{j,-1} - \ln P_{n,-1}) + d_{iK} \ln K_{-1} + d_{iT} \ln T_{-1}) + \rho A_{i,-1}$$

Here ρ is the autocorrelation coefficient in the equation

$$u_i = \rho u_{i,-1} + e_i$$

It has to be constrained to be the same for all i in order to ensure that the factor shares add up to unity For simplicity consider the following proof in the case of two shares, A_1 and A_2, and one right-hand variable (X)

$$A_1 = X\beta_1 + u_1$$

$$A_2 = X\beta_2 + u_2$$

Since $A_1 + A_2 = 1$, we require $X\beta_1 + X\beta_2 = 1$, and therefore $u_1 + u_2 = 0$. Now suppose $u_1 = \rho_1 \cdot u_{1,-1}$

It follows that

$$\begin{aligned} u_2 &= -u_1 \\ &= -\rho_1 \cdot u_{1,-1} \\ &= \rho_1 u_{2,-1} \end{aligned}$$

Thus the autocorrelation coefficient is the same in the equation for A_2 as for A_1. I am grateful to Larry Lau for pointing this constraint out

Footnote No.

44 Up to 1956 I assume part-time woman-hours to be proportional to full-time, and part-time hourly earnings to be proportional to full-time.

45 J.M. Anderson, 'Substitution among age groups in the U.S. labor force', Williams College, mimeo, December 1978. He used four factors in a translog production function - capital, and workers aged under 25 (Y), 25-55 (M) and over 55 (O). The price elasticities (with capital variable) were

	Y	M	O
Y	-2.5	1.9	.6
M	.3	-.9	.4
O	.3	1.7	-2.7

R. Freeman, 'The effect of demographic factors on age-earnings profiles', NBER Working Paper No. 316, February 1979. He used four factors - capital, men 20-34 (Y), men 35-64 (M) and women 20-64 (W). The own-price elasticities (with capital variable) were

	Y	M	W
Y	-2.14	1.64	.19
M	.76	-1.21	.29
W	.29	.94	-1.25

46 The model reported here includes no adjustment mechanism. But I have also estimated the model with $\ln P$ replaced by $.5 \ln P + .33 \ln P_{-1} + .17 \ln P_{-2}$. The estimated price elasticities were very similar. However, I am currently, with John Abowd, estimating a fuller model which includes a fully-specified adjustment mechanism and distinguishes between people and people-hours.

47 Department of Employment, *British Labour Statistics Year Book, 1976* Table 119.

Table 1

Age-specific unemployment rates for non-students in Britain (1971) and U.S. (1970)

Percentage

	Men		Women	
	Britain	U.S.	Britain	U.S.
Under 25	6.6	9.6	5.1	8.2
25+	3.6	2.8	3.2	4.1
Total	4.2	3.6	3.7	4.9
(Under 25 rate divided by 25+ rate)	(1.8)	(3.4)	(1.6)	(2.0)

Source and Notes: See Table 2.

Table 2

Schooling, labour force participation and unemployment in Britain (1971) and U.S. (1970)

	% of population who are non-students			% of non-students who are in labor force			% of non-students in civilian labor force who are unemployed		
Age	Britain	US(W)	US(B)	Britain	US(W)	US(B)	Britain	US(W)	US(B)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Males									
(15)	(31.4)	(4.4)	(7.6)	(87.3)	(32.5)	(26.5)	(21.7)	(16.0)	(20.6)
16	52.3	7.9	11.8	97.1	48.6	34.7	8.8	21.6	27.0
17	71.0	13.3	20.5	97.9	65.3	48.0	6.7	19.0	27.1
18	78.8	30.2	45.0	98.1	82.8	71.8	7.2	12.9	20.8
19	83.6	48.2	61.6	98.0	86.4	71.8	7.1	11.2	18.6
20	85.5	59.8	77.8	97.8	88.3	76.0	6.9	9.6	14.6
21-24	92.8	75.8	87.5	98.2	92.4	82.1	5.4	6.4	10.4
25-29	98.2	89.5	93.3	98.3	95.6	87.3	4.2	3.3	6.0
30-34	99.2	94.7	95.3	98.2	96.2	89.1	3.9	2.6	4.7
Females									
(15)	(31.7)	(5.0)	(8.4)	(87.0)	(19.5)	(16.7)	(14.9)	(15.9)	(25.4)
16	52.0	8.5	13.1	94.1	26.5	20.7	6.8	21.9	33.0
17	69.7	15.0	22.2	91.6	35.2	29.2	5.3	19.3	31.1
18	79.6	38.9	46.9	86.5	59.6	44.4	5.0	11.7	24.4
19	85.2	54.9	63.6	80.9	63.1	50.6	4.8	9.3	21.0
20	87.2	67.6	79.5	74.4	62.4	55.3	4.5	7.8	15.9
21-24	95.9	85.6	89.8	61.1	56.9	58.9	4.1	5.7	11.8
25-29	99.2	95.4	95.5	43.1	43.1	58.3	4.3	4.9	8.5
30-34	99.4	96.6	96.3	44.8	41.8	59.1	4.2	4.6	7.0

Source and notes: See next page.

Source: Britain: 1971 Census, Economic Activity Table 3.

U.S.: U.S. Department of Commerce, Bureau of the Census,
1970 Census of Population, Detailed Characteristics,
Final Report, PC(1)-D1, U.S. Summary, Table 217.

Notes:

1. Britain relates to 24 April 1971; U.S. relates to 1 April 1970. U.S. (W) relates to whites and U.S. (B) to blacks.
2. Non-students in Britain include part-time students; in the U.S. they do not. In Britain a student is someone who will be studying in the following April/May term; in the U.S. a student is someone who has studied at all since 1 February.
3. The labor force is the employed (defined identically) plus the unemployed. The employed labour force includes those who worked at any time for pay or profit during the week (including unpaid family work) plus those temporarily away from their job due to holiday, sickness, or industrial dispute. In Britain, unlike the U.S., temporary layoffs are treated as employed, but the maximum number of such people since 1973 has been 34,000 and the usual number is under 10,000.
4. In Britain the unemployed include those persons currently "seeking work or waiting to take up a job". In the U.S., the unemployed include all who have looked for work in the last 4 weeks or due to take up a job within a month, or on temporary lay-off. The unemployed include those looking for part-time work, in both countries.

Table 3

Male unemployment rates for non-students: by age (1976)

Age	Britain (Jan.)	Britain (July)	U.S. (All year)
16-17	12.4	26.8	28.4
18-19	11.1	10.6	17.3
20-24	10.0	9.3	11.0
25-34	6.6	6.2	6.2
35-44	5.5	5.2	4.1
45-54	4.6	4.5	4.0
55-59	4.9	4.9	4.2
60-64	9.5	9.5	
65+			5.2
Total	6.9	7.3	7.0

Source: Department of Employment Gazette, January 1979, p. 40.

Employment and Training Report of the President, 1978, Tables A3, A19 and B7.

Notes: 1. U.S. data include persons in school if they were also in the labour force.

2. A fine age breakdown of youth unemployment is only available in Britain in January and July and in the U.S. in October. The first three U.S. figures relate to October, but other data show that for those aged 16-21 not in school the October rate is quite close to the annual average (B.L.S. Handbook of Labor Statistics 1977 p.57). There is surprisingly little month to month variation in the unemployment rate for such people, though in January it is higher than the annual average by about the same proportion as the all-age unemployment rate is (Ibid., p.57 and 63).

3. In Britain the pattern of male unemployment was very similar in January 1976, 1977 and 1978.

Table 4

Unemployment rates: by age

	Males				Females			
	Britain		U.S.		Britain		U.S.	
	Under 20*	All ages	18-19	All ages	Under 20*	All ages	18-19	All ages
1959	1.6	2.2	15.1	5.3	0.8	1.5	13.1	5.9
1960	1.0	1.7	16.5	5.4	0.6	1.2	13.0	5.9
1961	0.8	1.5	15.2	6.4	0.5	1.0	14.5	7.2
1962	1.7	2.1	13.0	5.2	1.1	1.3	12.3	6.2
1963	1.9	2.6	14.8	5.2	1.4	1.5	14.9	6.5
1964	1.3	1.8	13.3	4.6	0.8	1.1	15.3	6.2
1965	1.1	1.6	10.4	4.0	0.7	0.9	13.7	5.5
1966	1.2	1.7	8.4	3.2	0.7	0.8	12.6	4.8
1967	2.6	2.8	10.7	3.1	1.3	1.1	16.1	5.2
1968	2.6	3.1	9.5	2.9	1.2	1.0	12.9	4.8
1969	2.7	3.1	8.9	2.8	1.1	0.9	11.0	4.7
1970	3.4	3.4	14.1	4.4	1.4	1.0	16.4	5.9
1971	5.4	4.5	14.6	5.3	2.4	1.3	16.7	6.9
1972	6.8	4.9	11.9	4.9	3.1	1.5	15.2	6.6
1973	3.3	3.5	9.9	4.1	2.0	1.1	13.8	6.0
1974	3.6	3.5	15.3	4.8	2.0	1.0	16.9	6.7
1975	7.4	5.2	18.6	7.9	5.3	1.9	19.0	9.3
1976	9.1	6.7	17.3	7.0	8.0	3.0	18.5	8.6
1977	9.6	7.0	-	6.2	9.4	3.8	-	8.2

Source and notes: See next page.

Source: British data kindly supplied by Peter Makeham of the Department of Employment from his forthcoming study of youth unemployment. For his basic findings see D.E.G., August 1978.

U.S., E.T.R.P. 1978, Tables B7 and A 19.

Notes:

1. * The British youth rates relate to July but exclude from the unemployed "unemployed school leavers" (i.e. people under 18 who have never had a full-time job). This is to eliminate variation due to changes in school-leaving dates and dates of the unemployment count. If school leavers are included the youth figures are

	Male	Female
1959	1.7	1.0
1975	9.8	7.4

Adult students are also excluded - there were very few of these till 1975 when the National Union of Students began encouraging students to claim benefit.

2. If British youth unemployment rates are measured in January (which is impossible for 1974 and 1975), they have similar year to year movements to their series but with the ratio of July to January rising secularly as the employment situation worsens.

3. U.S. rates are all-year rates.

Table 5

Percentage of population in labour force, Britain (1971) and U.S. (1970)

	Men			Women		
	Britain	US Census	US CPS	Britain	US Census	US CPS
35-44	98.3	94.8	96.9	57.5	50.2	51.1
45-54	97.6	94.5	94.2	60.6	52.5	54.4
55-59	95.3	86.8	83.0	51.1	47.4	43.0
60-64	86.6	73.0	83.0	28.2	36.1	43.0
65-69	30.6	39.0				

Source: Britain: Department of Employment Gazette, April 1978. Based on Census.
US: Census Detailed Characteristics Table 215; ETRP 1978

Table 6

Average hourly earnings of manual workers within each age group as percentage of average hourly earnings of all manual workers in the same column 1976/7

Britain			U.S.		
Age	Males	Females	Age	Males	Females
Under 18	51	68			
18-20	76	90	16-19	56	74
21-24	96	100	20-24	82	97

Note: U.S. data relate to workers paid at hourly rates (including part-timers and students) in May 1976. British data relate to full-time manual workers in April 1977.

Source: Britain: DE, New Earnings Survey 1977, p. A18 and A19.

U.S.: U.S. Department of Labor, B.L.S. Weekly and Hourly Earnings Data from the Current Population Survey, Special Labor Force Report 195, 1977, Table 4.

Table 7

Average weekly earnings within each age group as percentage of average weekly earnings of workers of all ages in the same column 1976/7.

	Britain		U.S.	
	Males	Females	Males	Females
Under 18	42	58		
18-20	63	78	59	80
21-24	84	96	59	80
25-29	98	116	89	104

Note: U.S. data relate to annual earnings of year-round, full-time workers. British data relate to weekly earnings of full-time employees in the survey week or month.

Source: Britain: DE New Earnings Survey 1977 p. A18 and 19.

U.S.: Department of Commerce, Bureau of the Census, Current Population Report, Series P-60 No. 114., Money Income in 1976 of Families and Persons in the U.S. 1978 p.203-204

Table 8

Average uncompleted duration of male unemployment, and the approximate cost of male unemployment relative to potential male earnings

	Average uncompleted duration (Weeks)	Unemployment rate (%)	Approximate cost of unemployment relative to potential male earnings (Index)
	(1)	(2)	(3)
Britain (July)			
1971	23.4	4.5	105
1972	27.8	4.9	136
1973	30.8	3.5	107
1974	26.4	3.5	92
1975	22.3	5.2	116
1976	26.5	6.7	177
1977	28.1	7.0	196
1978	29.5	6.7	197
U.S. (All year)			
1971	11.3	5.3	60
1972	12.0	4.9	59
1973	10.0	4.1	41
1974	9.7	4.8	46
1975	14.1	7.9	112
1976	15.8	7.0	110
1977	14.3		

Source: Britain: D.E. Gazette, September 1978, p. 1049 and Table 4 of this paper.

U.S.: G. Akerlof and B. Main, 'Unemployment spells and unemployment experience', Federal Reserve Board, Washington D.C., Special Studies Paper No. 123, October 1978, and Table 4 of this paper.

Note: U.S. data assume duration to be the same for men as for men and women. This slightly understates duration (see Table 12).

Table 9

Completed duration of unemployment (weeks), (men)

	Average completed duration (Weeks)	Probability of entering unemployment (% per week)	Unemployment rate (%)
	(1)	(2)	(3)
Britain			
1972	13	0.38	4.9
1973	10	0.35	3.5
1974	9	0.39	3.5
1975	14	0.37	5.2
1976	16	0.42	6.7
1977	17	0.41	7.0
U.S.			
1972	6.2	0.79	4.9
1973	7.0	0.59	4.1
1974	5.6	0.86	4.8
1975	9.1	0.87	7.9
1976	8.0	0.88	7.0
1977	7.2	0.86	6.2

Source: Col. (1) - 1. U.S. data from Akerlof and Main, (see Table 8). They are got by applying the Salant method to the uncompleted durations.

2. The british data come from inflow data divided by stock data. Department of Employment Gazette, September 1978. They relate only to registered unemployment - most male unemployment is registered.

Col. (3) - Sources are ETRP and DE Gazette.

Col. (2) - Col. (3) divided by Col. (1).

Table 10

Distribution of males unemployed sometime during a 12 month period: by number of spells

	1	2	3	4-9	10+	All	Average number of spells
Britain June 71-72	66	20	7	5	2	100	1.8
U.S. Jan. 75-76	64	18	18			100	1.63
Jan. 76-77	61	19	20			100	1.67
Jan. 77-78	62	20	18			100	1.66

Source: Britain: DHSS study of claimants cited in D. Metcalf and S. Nickell, 'The plain man's guide to the out of work: the nature and composition of male unemployment in Britain', LSE Centre for Labour Economics, Discussion Paper No. 6.

U.S. : B.L.S., Work Experience of the Population, Special Tabulations. Data exclude students. The average figure is based on the assumption that average spells in the 3+ category are 3.5, as normally assumed by B.L.S.

Table 11

Age specific indices (male, non-students) (All ages = 1.0)

	Average completed duration (Weeks)	Probability of entering unemployment (% per week)	Unemployment rate (%)
	(1)	(2)	(3)
Britain (Jan. 1978)			
16-17	0.53	3.38	1.79
18-19	0.70	2.11	1.48
20-24	0.80	1.71	1.37
All ages	1.00	1.00	1.00
U.S. (1976)			
16-17	0.75*	5.41	4.06
18-19	0.75*	3.29	2.47
20-24	1.06	1.48	1.57
All ages	1.00	1.00	1.00

Source: Col.(1) - Britain: D.E. Gazette, February 1978, p. 205.

U.S.: K. Clark and L. Summers, 'Labour Force Transitions and Unemployment', Table 3. They get very similar results for 1974 - and also for 1968-76 in 'The dynamics of youth unemployment', Table 1.3.

Col.(3) - Britain: D.E. Gazette, March 1979, p. 262.

U.S.: ETRP, 1977.

Col.(2) - Col.(3) divided by Col.(1).

Note: * Separate figures not available.

Table 12

Uncompleted duration of unemployment (weeks)

	Mean duration				Percentage unemployed over 13 weeks (Britain) 15 weeks (U.S.)			
	Britain		U.S.		Britain		U.S.	
	Jan. 1976	July 1976	Jan. 1976	July 1976	Jan. 1976	July 1976	Jan. 1976	July 1976
Men								
Under 18	13.6	6.9	10.3	6.0	41	11	21	11
18-19	16.6	18.0			44	42		11
20-24	19.5	22.5	14.9	10.0	48	51	30	29
All ages	25.4	26.5	15.9	12.3	56	54	32	29
Women								
Under 18	13.1	7.1	9.5	6.1	41	12	20	10
18-19	15.2	16.1			40	40		10
20-24	16.1	18.1	10.9	8.1	42	45	20	16
All ages	18.0	16.7	12.6	9.5	45	38	25	21
Aggregate unemployment rate								
Men	6.7		6.2					
Women	3.0		8.2					

Source: D.E., British Labour Statistics Year Book, 1976, Table 113.
B.L.S., Employment and Earnings, July 1978, p. 32, and Handbook of Labor Statistics, 1977.

Note: 1. British data relate to period registered at exchange; U.S. data relate to reported period looking for work.
2. U.S. data include students but other data suggest that, holding age constant, duration of students and non-students are similar.

Table 13

Time-series regressions (all variables in logarithms)

Dep. Var.	Period	VAC	UA	WY/WA	POPY/POPA	Const.	R^2	DW	SE
UY/UA	59-72	-.54 (.06)		4.62 (.52)	1.29 (.40)	-18.7	.96	2.63	.048
UY/UA	59-74	-.50 (.05)		5.01 (.43)	1.43 (.40)	-20.7	.96	2.55	.046
UY/UA	59-76	-.38 (.06)		4.07 (.41)	.42 (.43)	-15.1	.93	1.49	.071
UY/UA	59-72		.40 (.06)	1.52 (.88)	1.64 (.52)	-10.1	.94	2.11	.060
UY/UA	59-74		.43 (.06)	.60 (.70)	1.46 (.53)	- 6.5	.91	1.88	.066
UY/UA	59-76		.38 (.07)	.71 (.69)	.96 (.40)	- 5.7	.93	1.90	.073

Note: Standard errors in brackets. All regressions estimated by Cochrane-Orcutt procedure; the Hildreth-Liu procedure gave very similar results.

Table 14

Demand elasticities and elasticities of substitution

		Youths	Girls	Women	Men
e_{ij}	Youths	-1.25	.29	.50	.47
	Girls	.82	-.31	-.85	.34
	Women	.12	-.07	-1.59	1.55
	Men	.02	.01	.32	-.35
s_{ij}	Youths	-33.6	22.1	3.1	.6
	Girls	22.1	-23.5	-5.3	.4
	Women	3.1	-5.3	-9.9	2.0
	Men	.6	.4	2.0	-.4
t-ratio	Youths	5.8	2.5	1.8	1.3
	Girls	2.5	.9	2.0	.7
	Women	1.8	2.0	10.5	9.5
	Men	1.3	.7	9.5	9.2

Note: 1. The elasticities are for given capital and output. The t-ratios apply equally to e_{ij} and s_{ij}.

2. In the equations for A_Y, A_G and A_W the implied values of DW and R^2 were as follows:

	A_Y	A_G	A_W
R^2	.96	.92	.92
DW	1.11	1.87	.90

CHART 1

Unemployment rates of males aged under 20 (excluding school leavers) and all males, 1959-1976

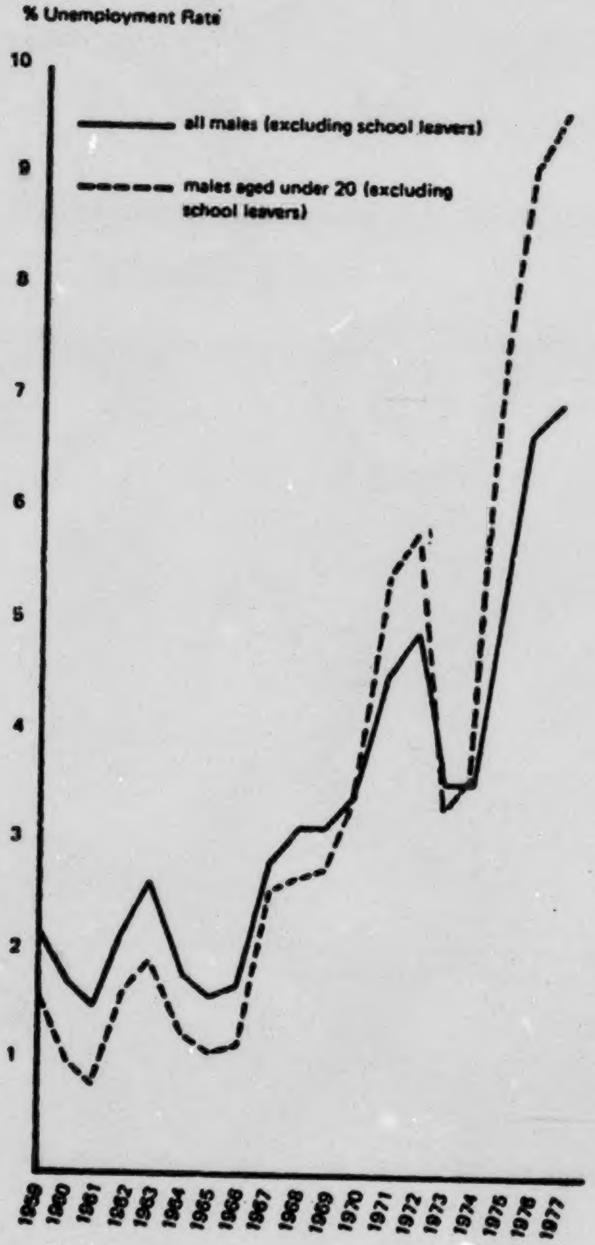
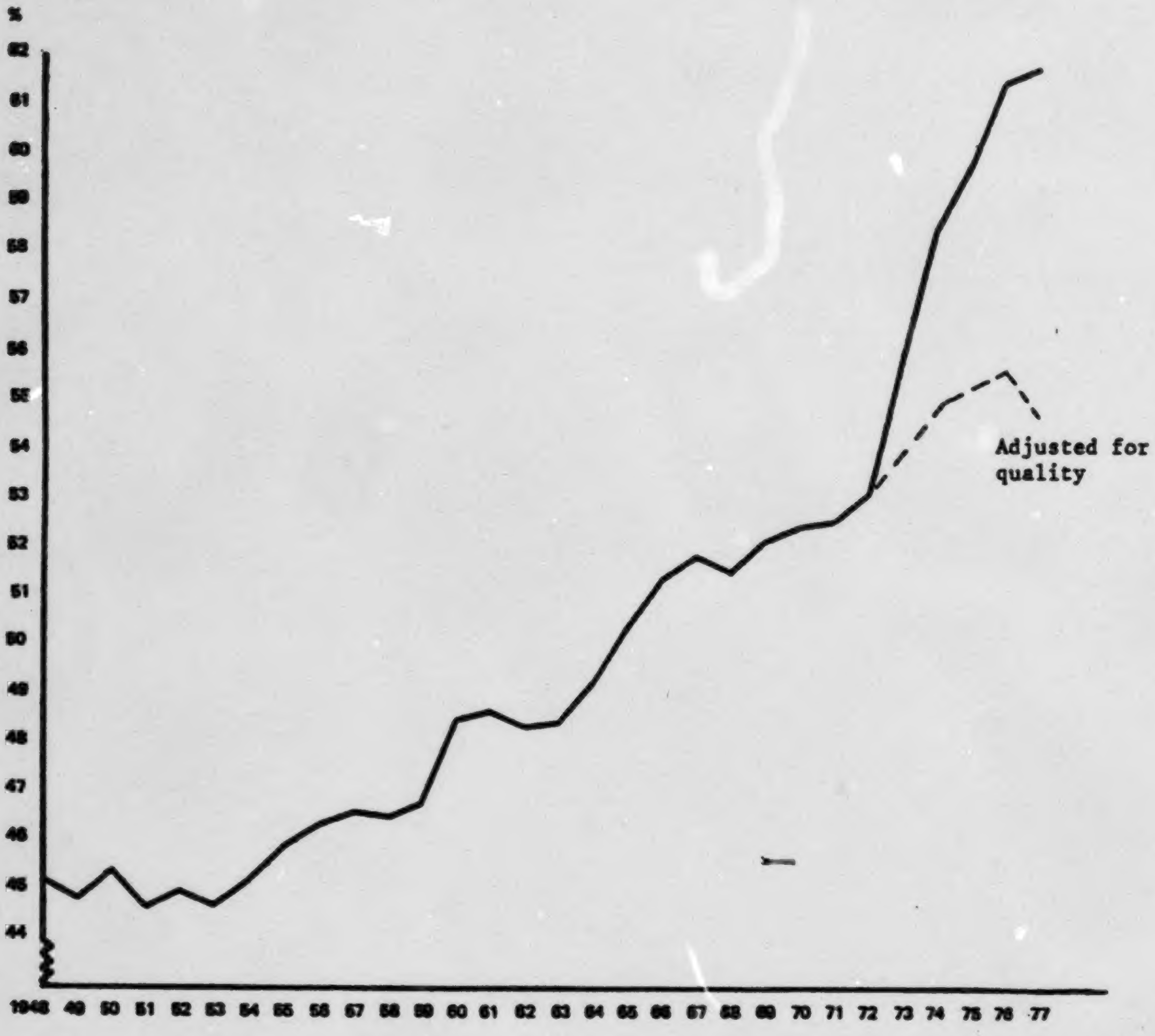


CHART 2

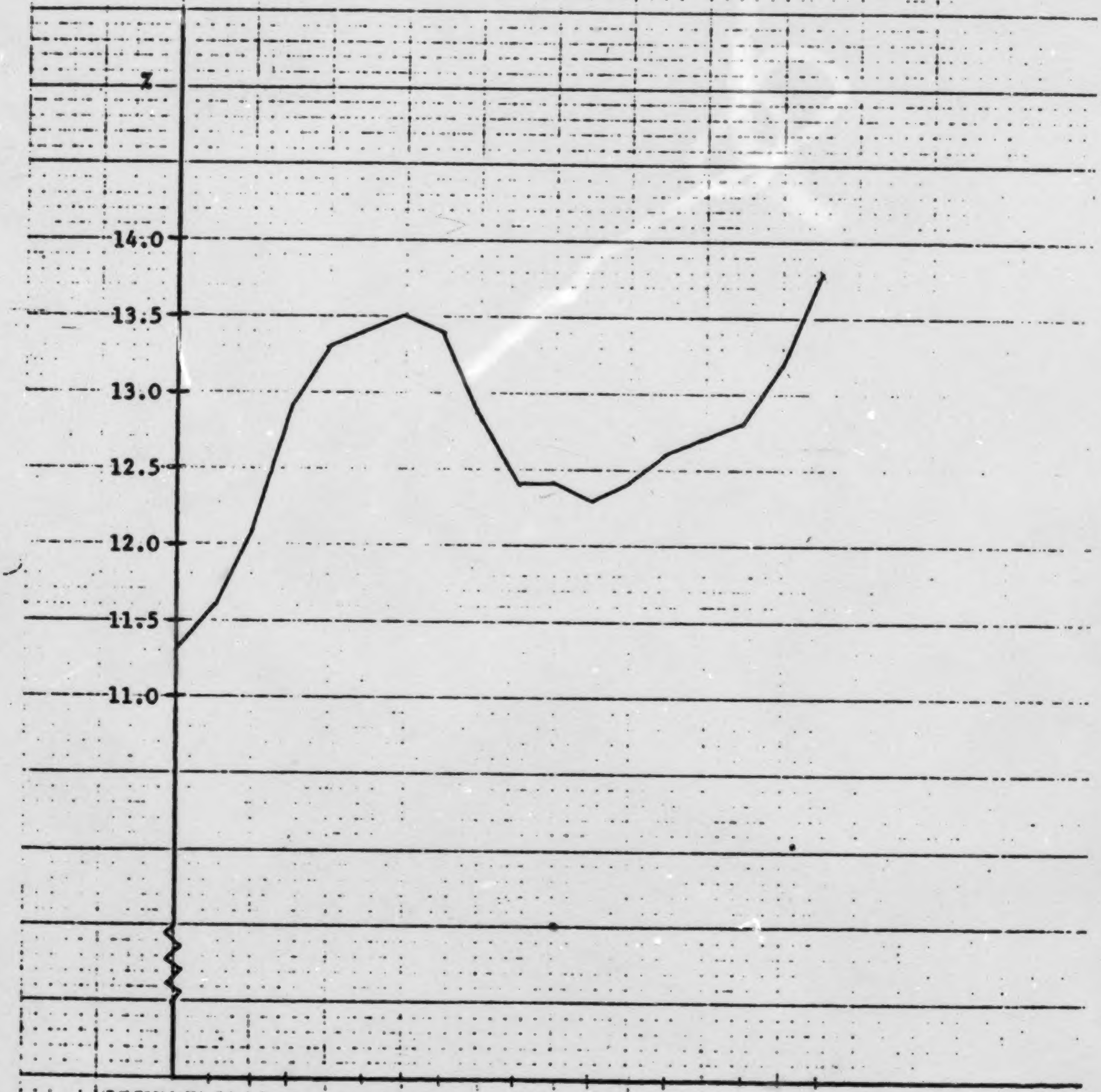
Average hourly earnings of youths and boys aged under 21 as a per cent of adult male hourly earnings 1948-1976 - manual workers, all industries UK



Source: Department of Employment Gazette, October earnings survey.

CHART 3

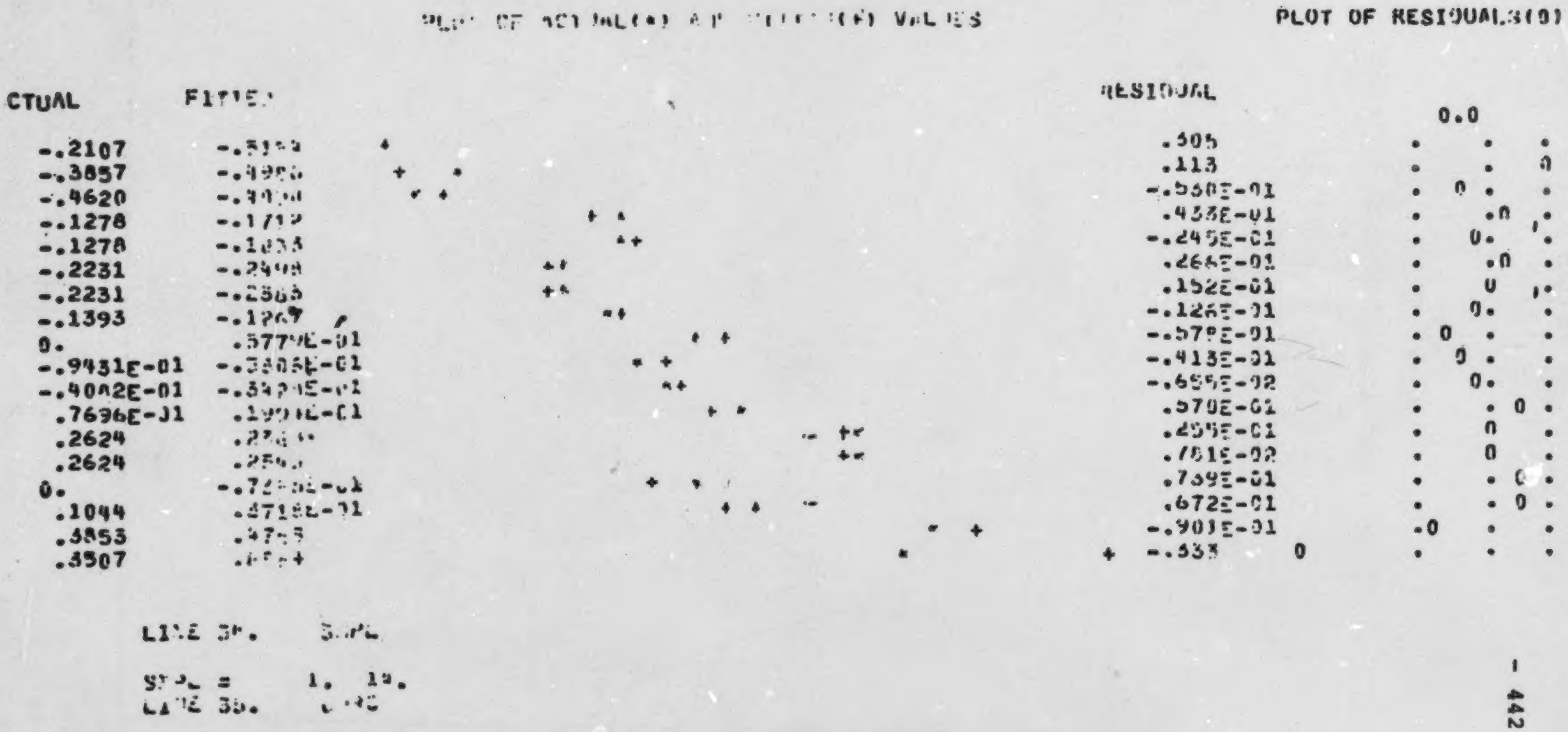
Males aged 15-19 as percentage of males aged 15-60



Source: Estimates supplied by the Department of Employment.

CHART 4

Top equation of Table 13, estimated for periods 1-14



```
                         PLOT OF ACTUAL(*) AND FITTED(+) VALUES                                     PLOT OF RESIDUALS(0)

CTUAL          FITTED                                                                   RESIDUAL
                                                                                                             0.0
  -.2107        -.5157    *                                                                   .305        .       .    .
  -.3857        -.4986     +    *                                                             .113        .       .    0
  -.4620        -.4061      *  +                                                          -.559E-01       .  0    .    .
  -.1278        -.1712                *  *                                                  .434E-01      .       .0   .
  -.1278        -.1033                  *+                                                -.245E-01       .    0.      .
  -.2231        -.2498              *+                                                      .266E-01      .       .0   .
  -.2231        -.2383              +*                                                      .152E-01      .       0    .
  -.1393        -.1267                 *+                                                 -.126E-01       .    0.      .
  0.             .5779E-01                    *  +                                        -.578E-01       . 0     .    .
  -.9431E-01    -.5305E-01                 *  +                                           -.413E-01       .  0    .    .
  -.4082E-01    -.3427E-01                   *+                                           -.655E-02       .    0.      .
   .7696E-01     .1996E-01                      +  *                                        .570E-01      .       .  0 .
   .2624         .2369                                    *  +*                             .255E-01      .       0    .
   .2624         .2546                                       +*                             .781E-02      .       0    .
  0.            -.7590E-01                 +   *                                            .759E-01      .       .  0 .
   .1044         .3718E-01                      +  +    *                                   .672E-01      .       .  0 .
   .3853         .4754                                         *   +                      -.901E-01      .0       .    .
   .3507         .6884                                      *          +                  -.338     0   .       .    .

          LINE SP.    SCALE

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          LINE SP.    [illegible]
```
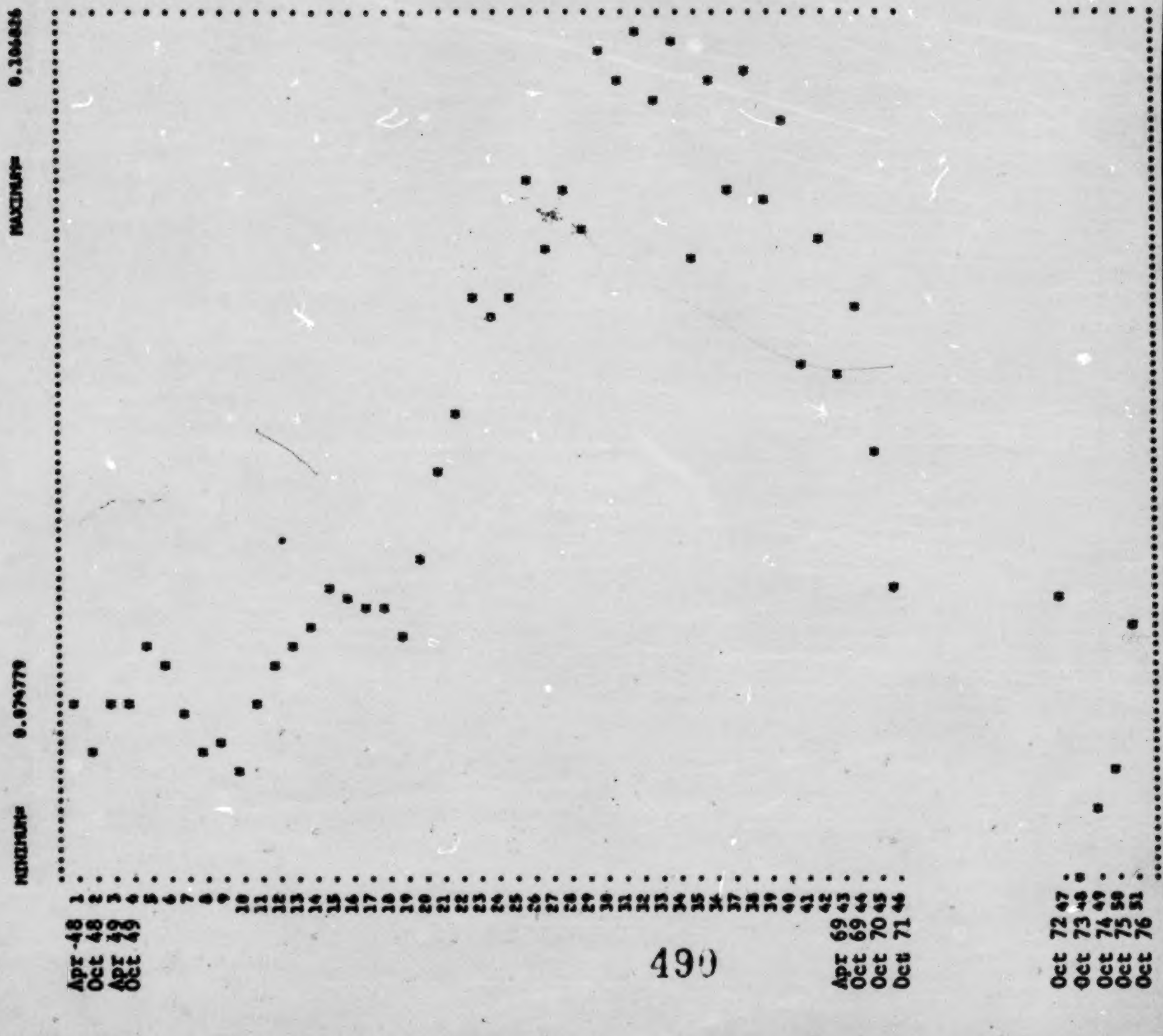
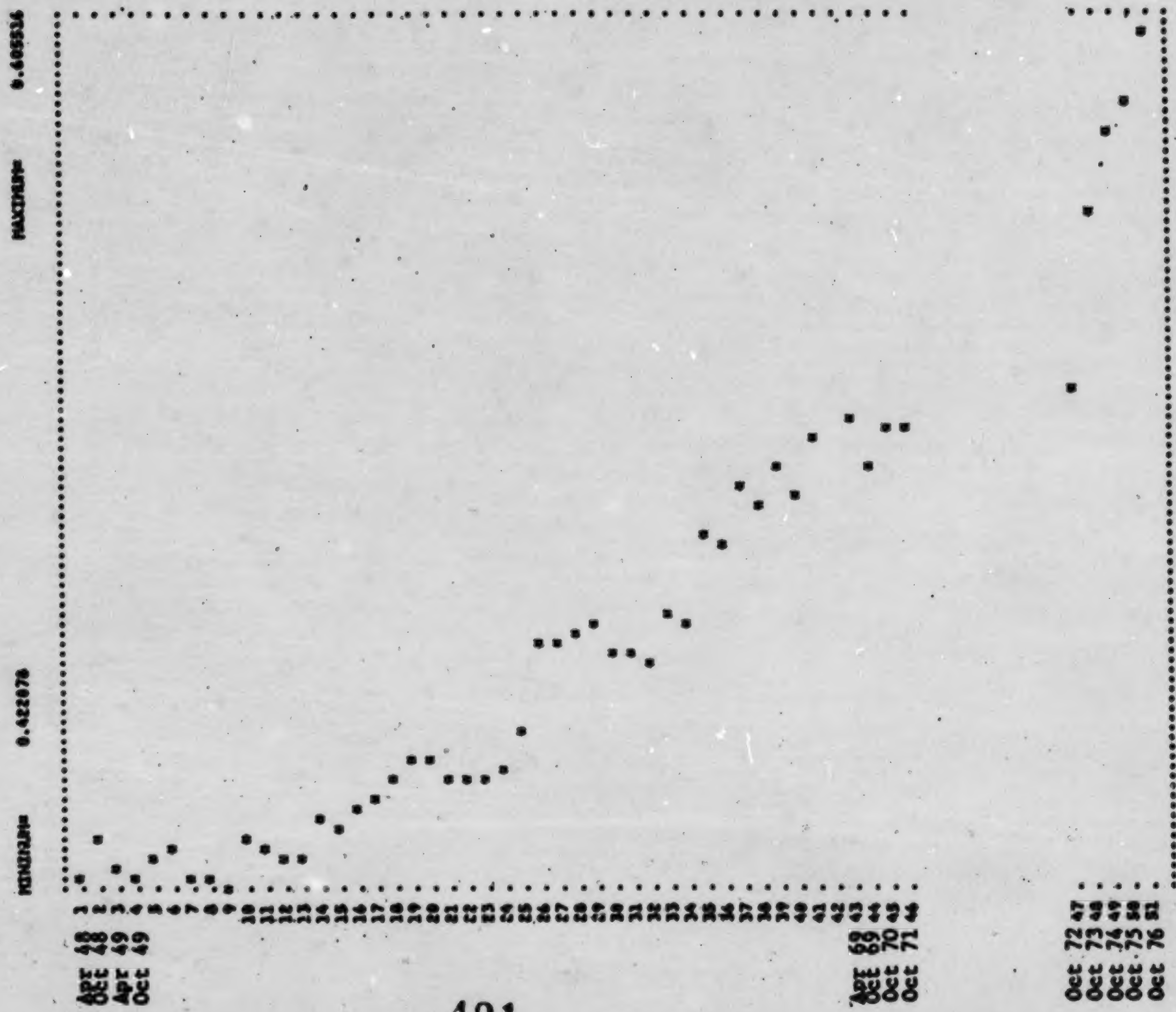
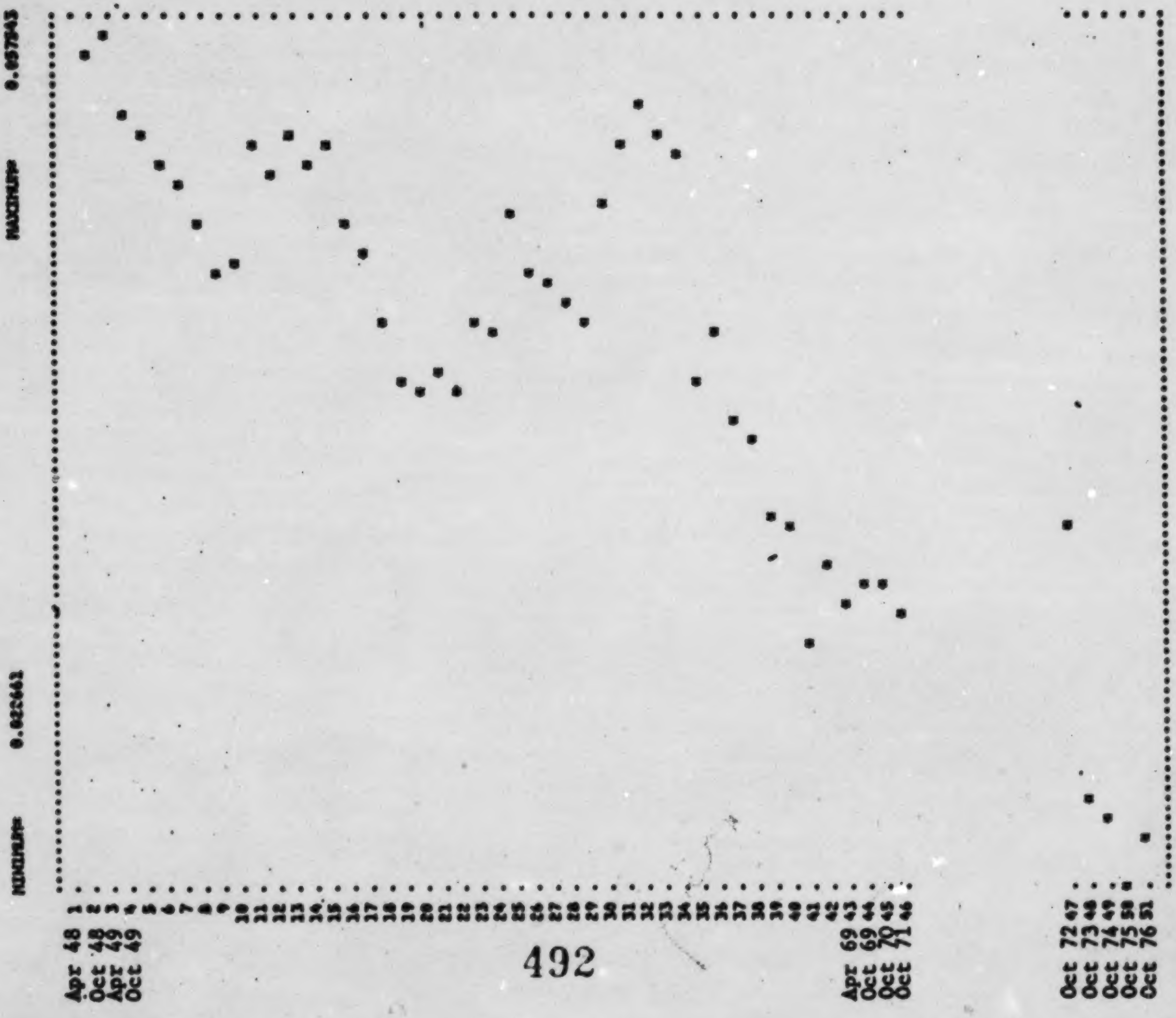

5A. Man hours : Youths/Men



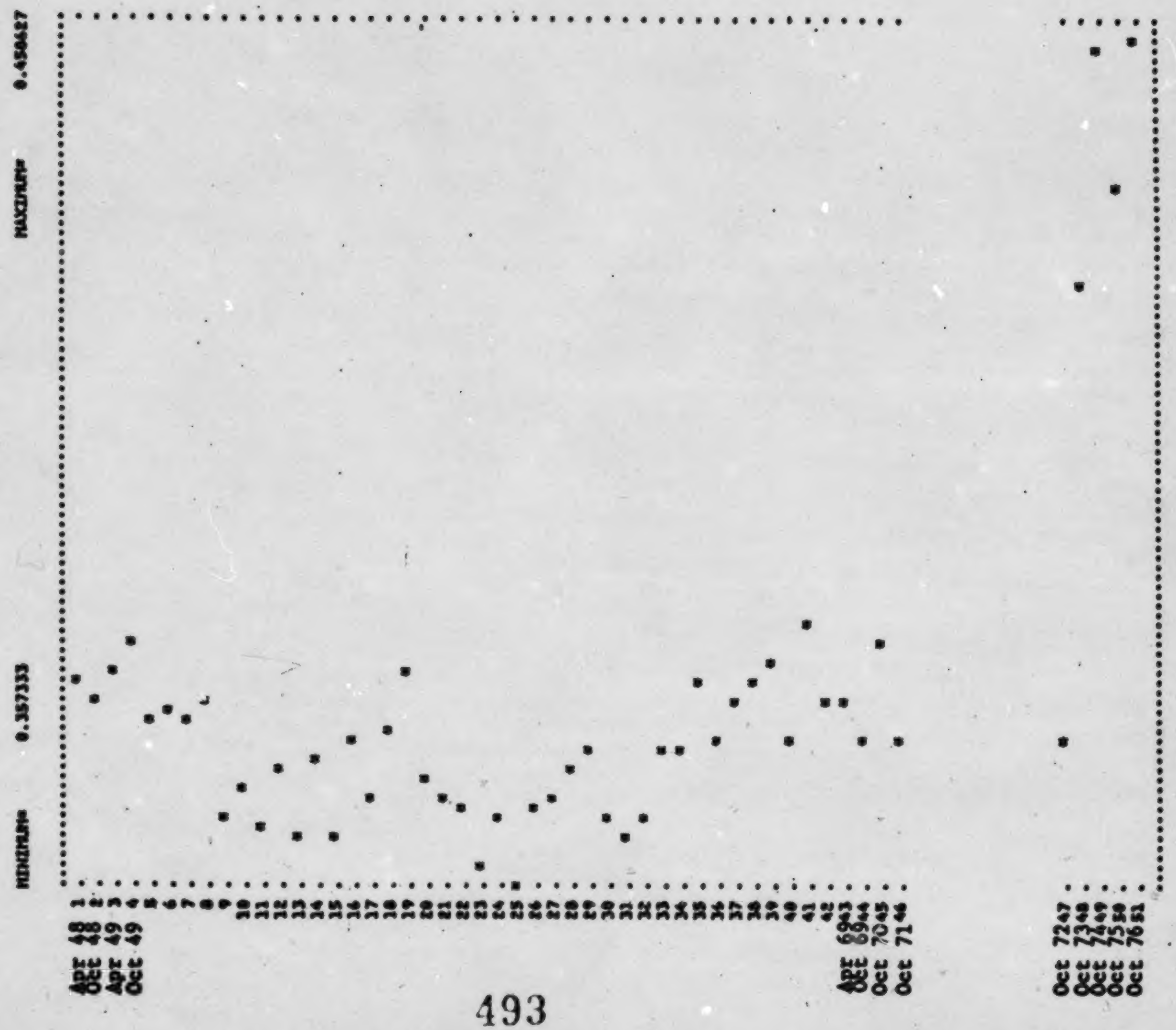
5B. Hourly wages : Youths/Men



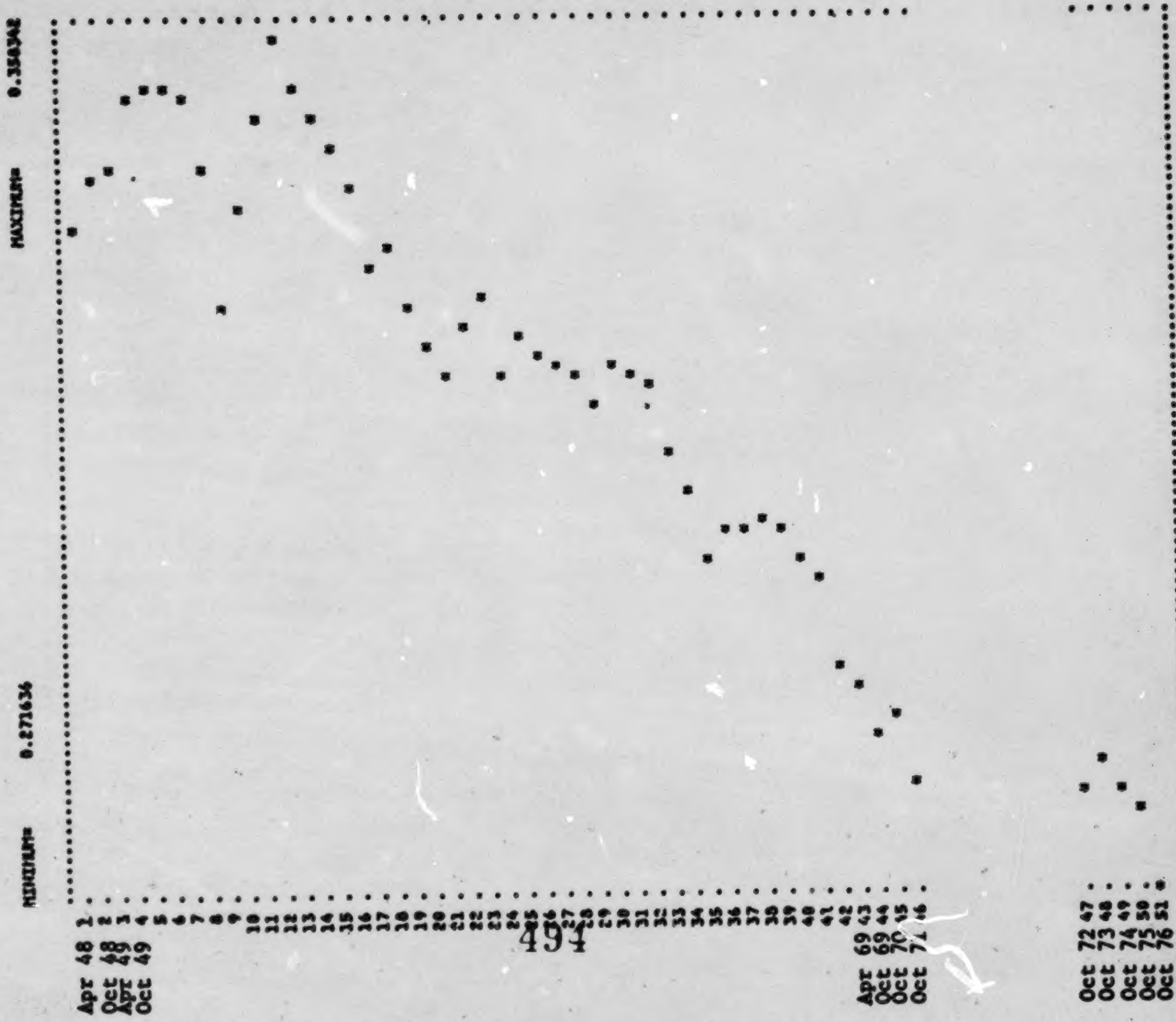
6A. Man hours : Girls/Men

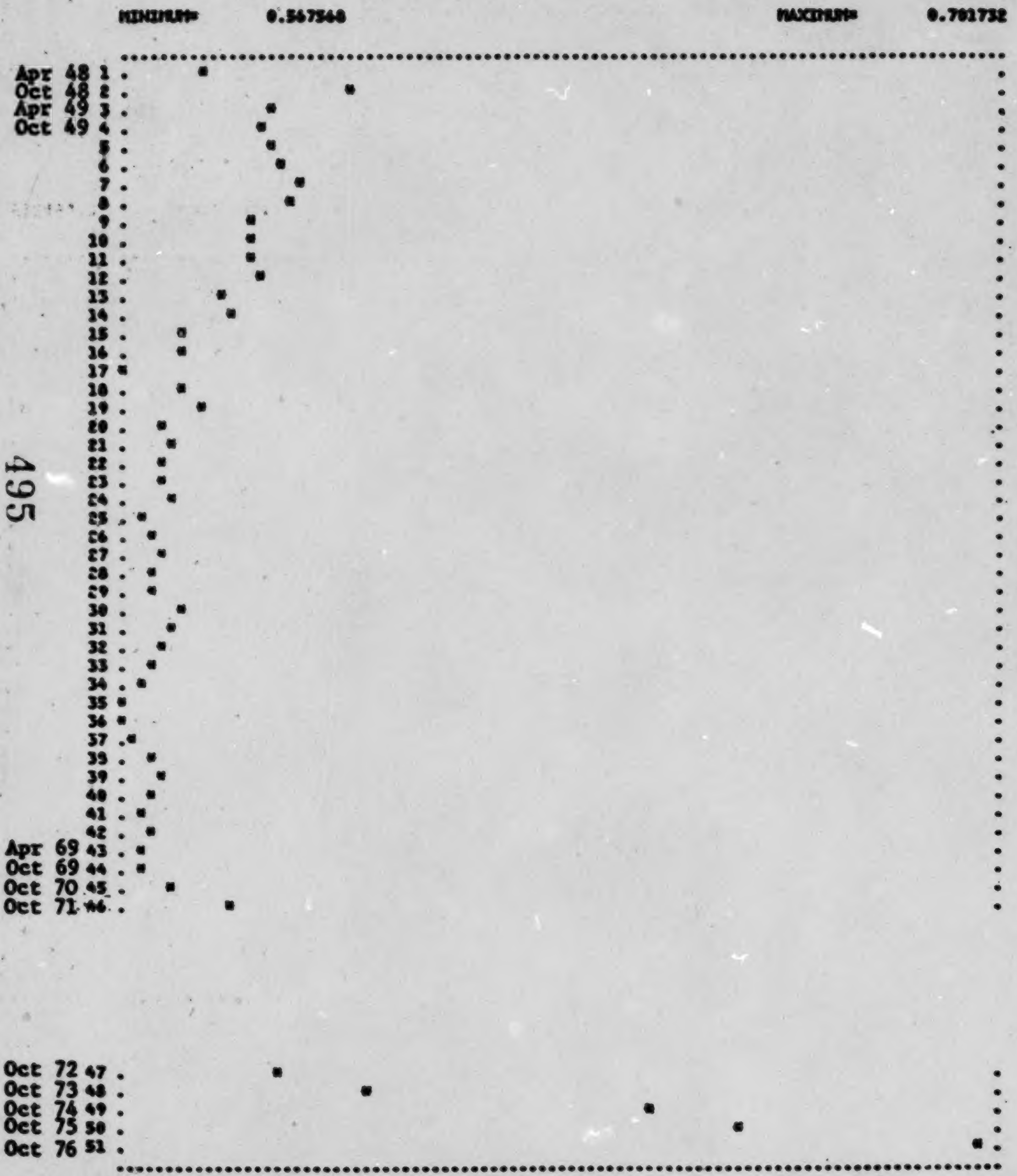


6B. Hourly Wages : Girls/Men



7A. Man hours : FT Women/Men

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MAXIMUM= 0.781732
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Oct 48 2
Apr 49 3
Oct 49 4
5
6
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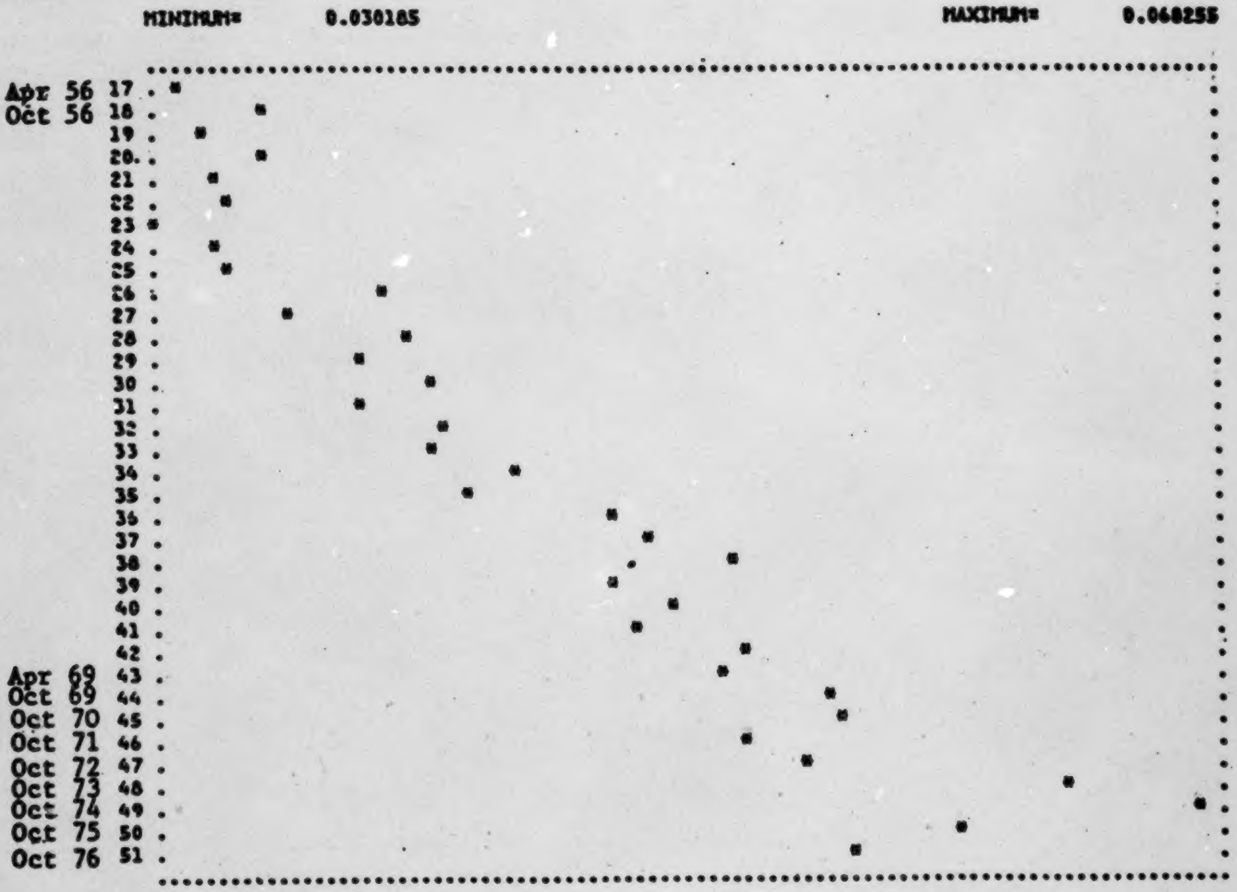
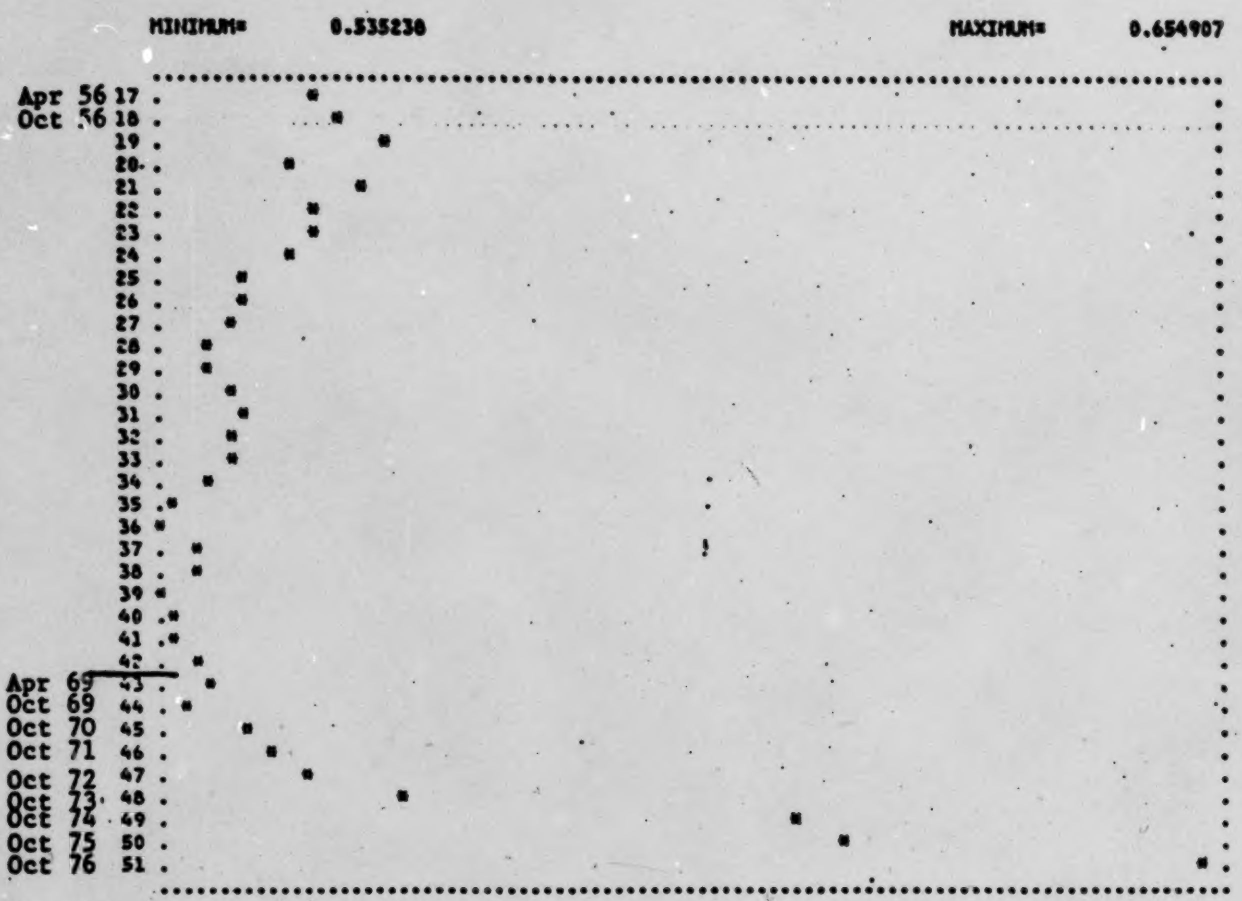
Apr 69 43
Oct 69 44
Oct 70 45
Oct 71 46
Oct 72 47
Oct 73 48
Oct 74 49
Oct 75 50
Oct 76 51

8A. Man hours : P.T. Women/Men



8B. Hourly Wages : P.T. Women/Men



The Minimum Wage and Job Turnover in Markets for Young Workers

Robert E. Hall

By the standard analysis, the minimum wage ought to create a shortage of jobs for young workers. The minimum sets a reward to work which draws the young into the labor market in numbers beyond the level of employment which employers are willing to provide. With large numbers of job-hunters looking for a small number of actual jobs, jobs become exceedingly hard to find, according to this view. The excessive effort required for young workers to find jobs in such a market is one of the important social costs of the minimum wage and is starkly evident in high unemployment rates for the young. This analysis has one important discrepancy from the actual experiences of American youths: In fact, jobs paying the minimum wage are quite easy to find. Millions of jobs are filled every year by a never-ending stream of youths. The young take no longer than mature workers to find jobs, even though they are clearly differentially influenced by the minimum wage. It is by now firmly established that high unemployment of youths is associated with high frequency of unemployment, not long duration of unemployment. To put it another way, the problem of jobs for the young is not that they are hard to find, but that they do not last very long.

This paper presents an alternative analysis of the effects of the minimum wage within a labor market where both job turnover and the availability of new jobs are determined through the interaction of the preferences of young workers, the costs of turnover and recruiting faced by employers, and the minimum wage set by the government. The essential hypothesis is that the arrangements observed in markets for the young are an adaptation that is as efficient as it can be in the face of the distortion imposed by the minimum wage. The paper argues that the principal effect of the minimum wage is to increase job turnover rather than make it more difficult for the unemployed to find work. Through their recruiting and layoff policies, firms can push the market toward a point where the trade-off between turnover costs and job-finding benefits is efficient. This point involves roughly the same degree of job-finding effort no matter how far the minimum wage distorts the market, at least up to a certain level. The markets most seriously affected by the minimum wage will have the highest rate of turnover, but the participants in them will not think of them as markets where work is hard to find.

The analysis presented here should help to square the economic analysis of the effects of the minimum wage with the facts about the operation of modern labor markets for the young. It does not alter in any important way the criticisms emerging from the standard analysis about the economic inefficiency of the minimum wage. The excessive turnover caused by the minimum wage is a waste of resources. High unemployment brought about by the minimum wage is just as costly when we understand that it comes from high turnover as it was when we mistakenly associated it with difficulties in finding work.

Data on Turnover and Employment

Table 1 presents data from U.S. surveys comparing turnover and unemployment among teenagers and adults. These data strongly confirm that the important difference between the two groups is in their rates of job separation, not in their rates of job-finding. The first two lines measure two different aspects of the job-finding process; teenagers and adults are similar in both. The first line shows the proportion of job-changers who do not experience any unemployment between jobs. If jobs for teenagers were harder to find than jobs for adults, the proportion of job-changers without unemployment would be lower for teenagers, but, in fact,

Table 1

Job-Finding, Separation, and Unemployment Rates by Age and Sex, 1974

	Male		Female	
	Teenage	Adult	Teenage	Adult
(1) Proportion of job-changers with no unemployment (%)	56.0	54.2	56.0	54.2
(2) Weekly job-finding rate of the unemployed (%)	6.0	5.7	5.3	3.9
(3) Weekly separation rate (%)	8.3	3.3	8.9	2.8
(4) Actual unemployment rate (%)	15.5	3.8	16.5	5.5

Notes and Sources:

(1) Based on data from Bancroft and Garfinkle (1973), quoted in Clark and Summers (1979).

(2) Estimated by Clark and Summers (1979) from CPS gross flows data. This is the observed monthly transition rate from unemployment to employment, divided by 3.3.

(3) Estimated by Clark and Summers (1979) by multiplying the observed transition rate from employment to nonemployment by the fraction of job changes made without intervening nonemployment (line (1)).

(4) Source: Employment and Training Report of the President.

the proportions are slightly higher for teenagers (the survey upon which this finding is based is not tabulated by sex). The second line shows the percent of the unemployed who take jobs each week. Again, if teenage markets were slacker, this percent would be lower than for adults, but, in fact, it is higher, especially among women. Note that the evidence from the first two lines of Table 1 does not involve the mistake of trying to infer rates of job-finding from data on the duration of unemployment. As Marston (1976) and Clark and Summers (1979) have pointed out, much of the explanation of the brief duration of unemployment among teenagers comes from their high propensity to drop out of the labor force while unemployed. However, the correct comparison in terms of actual success in finding work shows that teenagers are on a par with adults.

The third line of Table 1 presents data on the weekly rate of departure from jobs among the four age-sex groups. Between 8 and 9 percent of teenagers lose or quit their jobs each week, compared to about 3 percent of adults. Teenage jobs are brief--they last about 12 weeks on the average. The dramatic difference in separation rates stands in sharp contrast to the virtual equality of job-finding rates. The well-known large gap in unemployment rates, shown in the fourth line of Table 1, is due largely to the difference in job separation rates. Table 1 does not attempt a full description of the dynamic process by which workers move in and out of the labor force, which would be necessary to give a complete account of the differences in unemployment between teenagers and adults. For such an account, see Marston (1976) and Clark and Summers (1979).

Investigation of possible causes of high separation rates among young workers is the main purpose of this paper. Obviously, there are important normal influences toward brief jobs, including the fact that a fraction of employment takes the form of summer jobs. But the impression remains that much turnover is pathological. Consequently, the paper spends a good deal of effort investigating the possible role of the minimum wage in stimulating excessive job turnover.

Determination of Turnover, Job-Finding Rates, and Unemployment in the Presence of a Minimum Wage

The analysis presented in this section is closely related to an earlier paper of mine (Hall, 1979), modified suitably to take the minimum wage into account. The discussion here is intended to stand on its own, however,

The first component of the model describes the mechanical operation of the recruiting and job-finding process. The unemployed are viewed simply as a group of people who have not yet found work, but are confident of finding work eventually. Each of the unemployed has the same chance of locating a job each week. All unemployment is "frictional"; nobody is permanently unemployable. The state of tightness or slackness of the market is described by a single variable, the job-finding rate, which I will call f. It is the weekly probability that an unemployed worker will find a job. Tighter markets have higher values of f and are preferred by workers. On the other hand, slacker markets with lower values of f are preferred by employers for the following reason: Employers compete with each other for the workers who are available. When an employer extends a job offer in a tighter market, it is less likely to be accepted because the worker may also receive an offer from another employer at the same time. In formal terms, this consideration is embodied in a recruiting cost function, $\rho(f)$, which gives the number of offers that need to be made, on the average, to hire one new worker. As f approaches one, $\rho(f)$

approaches infinity--guaranteed instantaneous job-finding would make recruiting prohibitively expensive. In very slack markets with f near zero, $\rho(f)$ will be only slightly more than one. In my earlier paper, I derived an exact form, $\rho(f) = -\log(1-f)/f$, for the recruiting cost function, based on some further simple assumptions.

The job-finding rate is one of two major dimensions of conditions in the labor market; it does not by itself determine the unemployment rate. A very slack market where it is nearly impossible to find work could have a low unemployment rate because few workers came to it to search. Similarly, a tight market could have a high unemployment rate because there was a large continuing flow of newly unemployed workers into it. The latter is a good description of markets for youths in the modern U.S. economy. Thus the other dimension of labor market conditions is the separation rate--the weekly probability that an employed worker will become unemployed. In stochastic equilibrium, where the flow of workers into the pool of unemployment via job separations balances the flow out of the pool through finding new jobs, the unemployment rate will be

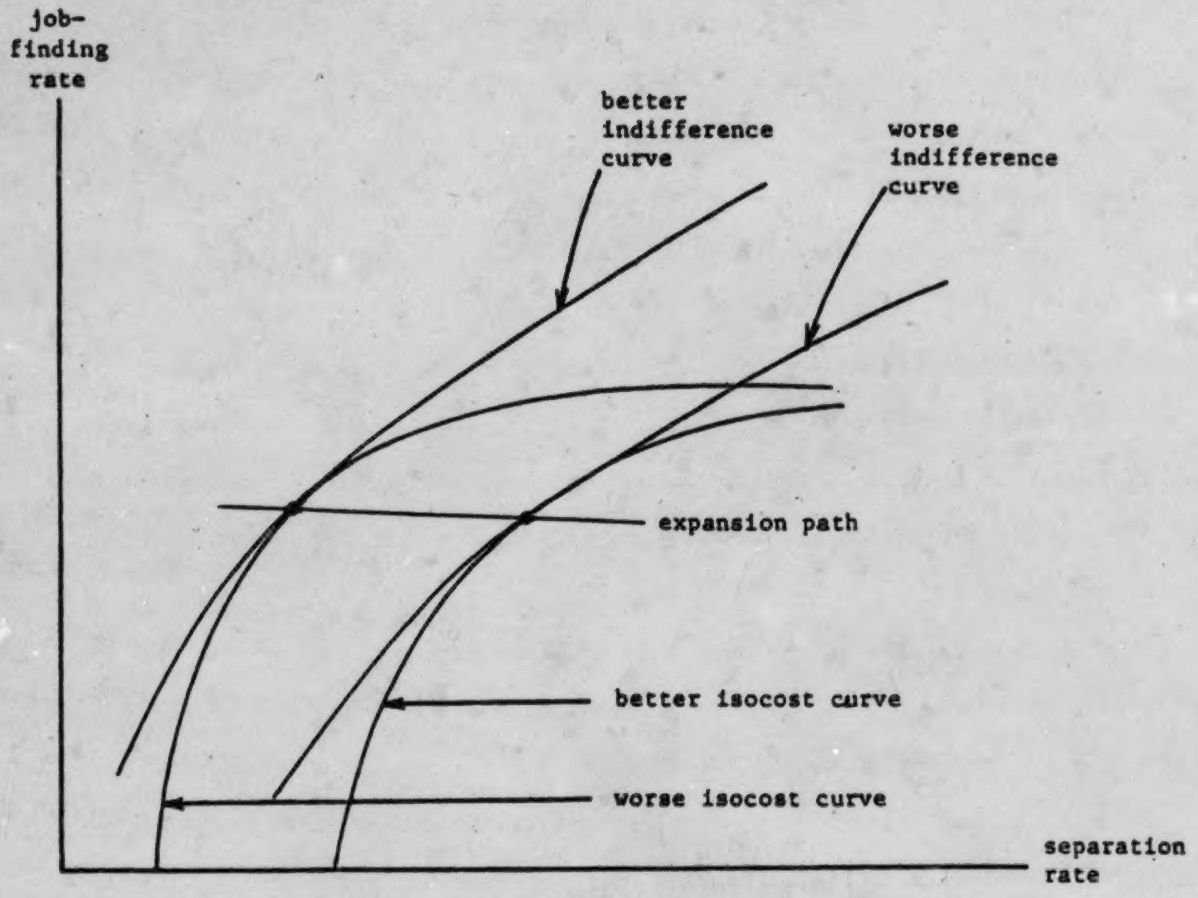
$$u = \frac{s}{s + f/(1-f)}$$

The job-finding rate, f, the separation rate, s, and the unemployment rate, u, are linked by this relation. Given the values of any two of these measures, the third is fully determined by it. In this paper, the job-finding and separation rates are considered explicitly and the corresponding unemployment rate is then derived. Of course, it is also true that unemployment is the difference between the supply of labor and the demand for it. Further discussion of determination of unemployment will continue after the principles of the efficient combination of separation and job-finding rates are presented.

It has already been established that both parties to the employment contract are concerned about the job-finding rate. Workers favor high rates and employers low rates. It is equally true that both parties are concerned about the separation rate. The rate is the reciprocal of the duration of employment: High separation rates mean jobs are brief. Both very long and very short jobs are generally undesirable from the employer's point of view. If an employer promises virtually permanent jobs to workers, it will be difficult to adjust total employment downward in the event of an adverse shift in demand. Permanent commitments also limit the employer's power to retain only the most productive of a group of new recruits. For these reasons, it is costly for employers to promise lengthy employment. On the other hand, very high turnover implies excessive recruiting and training costs. This second consideration has dominated most discussions of the economics of turnover. In markets for young workers, though, rather high turnover rates may actually be efficient, especially in lines of work where training costs can be made low. In these markets employers profit from the flexibility they enjoy in adjusting employment to each minor fluctuation in demand. The occasional redundancy of labor that is typical under more or less permanent employment arrangements is unnecessary where separation rates are high.

The hypothesis pursued in this paper is that employment terms adjust to mediate the conflicting attitudes of employers and workers about job-finding and separation rates. Specifically, the two parties should equalize their trade-offs between the two aspects of the arrangement. The minimum wage does not impose any limitations on these dimensions of the employment package. In a market unaffected by the minimum wage, the parties ought to equalize their trade-offs between cash wages and the separation or job-finding rates. The fully efficient outcome is described in my earlier paper. The influence of an effective minimum wage in the present analysis is to prevent employers from offering better duration terms to workers in exchange for lower cash wages.

In analytical terms, the efficient combination of separation rates and job-finding rates occurs at the point of tangency of an indifference curve and an isocost curve. The indifference curve describes the alternative combinations of separation and job-finding rates that achieve the same level of satisfaction, on the average, for workers. It presumably slopes upward, since workers will need to be rewarded with higher job-finding rates in order to induce them to accept higher turnover. The isocost curve, embodies the considerations about the costs and benefits to employers mentioned earlier. Its slope is positive for low separation rates, where the added flexibility of higher turnover is a benefit, and then turns negative for high separation rates, where recruiting and training costs begin to dominate. All this can be summarized in a diagram:


job-finding rate
better indifference curve
worse indifference curve
expansion path
better isocost curve
worse isocost curve
separation rate

The outcome of this analysis is an expansion path of alternative efficient combinations of separation rates and job-finding rates; call it f = θ(s). Different points on the path correspond to different levels of satisfaction achieved by workers and costs incurred by employers. If the market is operating at separation and job-finding rates that are not on this path, employers' costs can be reduced and workers' level of satisfaction improved by a suitable movement to a point on the path. Along the path, cost can be reduced only by making workers worse off by raising the separation rate.

The forces of supply and demand determine which of the efficient combinations of separation and job-finding rates will prevail in the market, and thus determine the unemployment rate. Since costs are sensitive to the separation and job-finding rates through recruiting and training costs, the total demand for labor in a market will be a function $L^D(w,s,f)$ of the hourly wage, w, and the separation and job-finding rates, s and f. Higher wages and higher job-finding rates depress the demand for labor, while higher separation rates stimulate it, at least over the range of variation that is considered here. Further implications of and justifications for the latter proposition are presented in the subsequent section of the paper.

The supply side of the market is a little more complex because the presence of unemployment even in equilibrium means that there are two different concepts of supply. The first, gross supply, corresponds to labor force participation--it consists of all the workers attracted to the market, including those looking for work who have not yet found it. Gross supply is a function, $L^S(w,s,f)$ of the terms of employment offered by the market. The other concept is net supply, which does not count the unemployed. If u is the unemployment rate implied by the separation and job-finding rates, net supply is $(1-u)L^S(w,s,f)$. Recall that u is a simple function of s and f, so that another way to express net supply is

$$\frac{f}{(1-f)s + f} L^S(w,s,f)$$

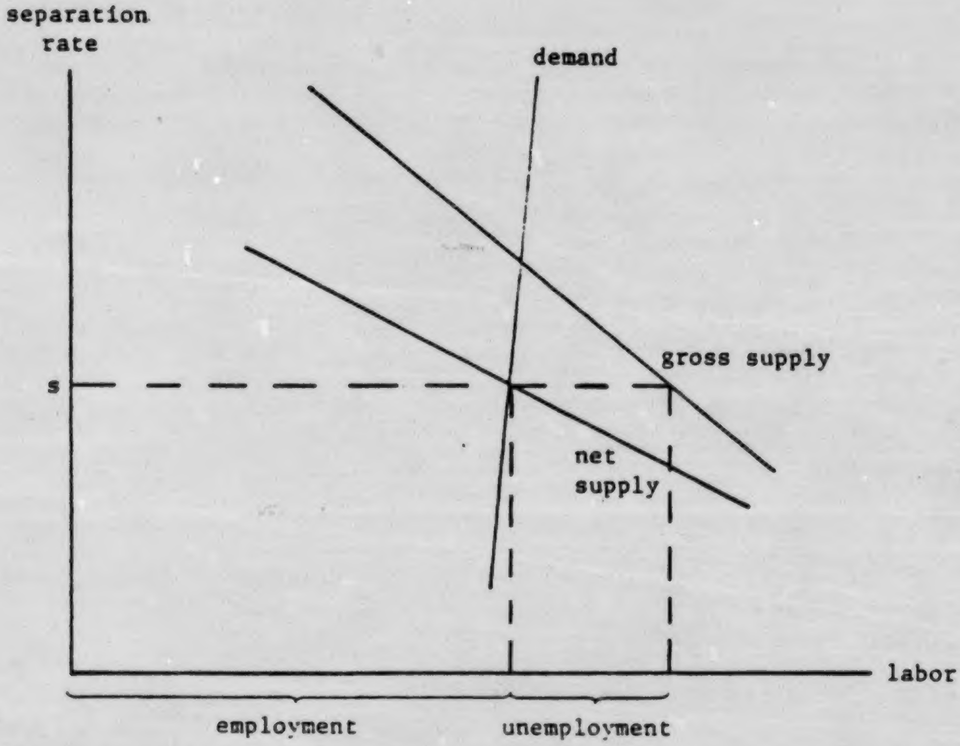
Equilibrium occurs in the market when demand and net supply are in balance:

$$L^D(w,s,f) = \frac{f}{(1-f)s + f} L^S(w,s,f)$$

The equilibrium that concerns this paper is the constrained one that occurs when the government sets the wage through an effective minimum wage at level $\bar{w}$. The wage itself cannot participate in the process of clearing the market, but variations in the separation and job-finding rates can bring about a constrained equilibrium in the market. I will assume that they move in tandem, so as to preserve the efficient combination of the two rates; that is, the job-finding rate is $\theta(s)$ and not a free variable. This condenses the market-clearing process to a single dimension, the separation rate:

$$L^D\big(\bar{w},s,\theta(s)\big) = \frac{\theta(s)}{\big(1-\theta(s)\big)s + \theta(s)}\, L^S\big(\bar{w},s,\theta(s)\big)$$

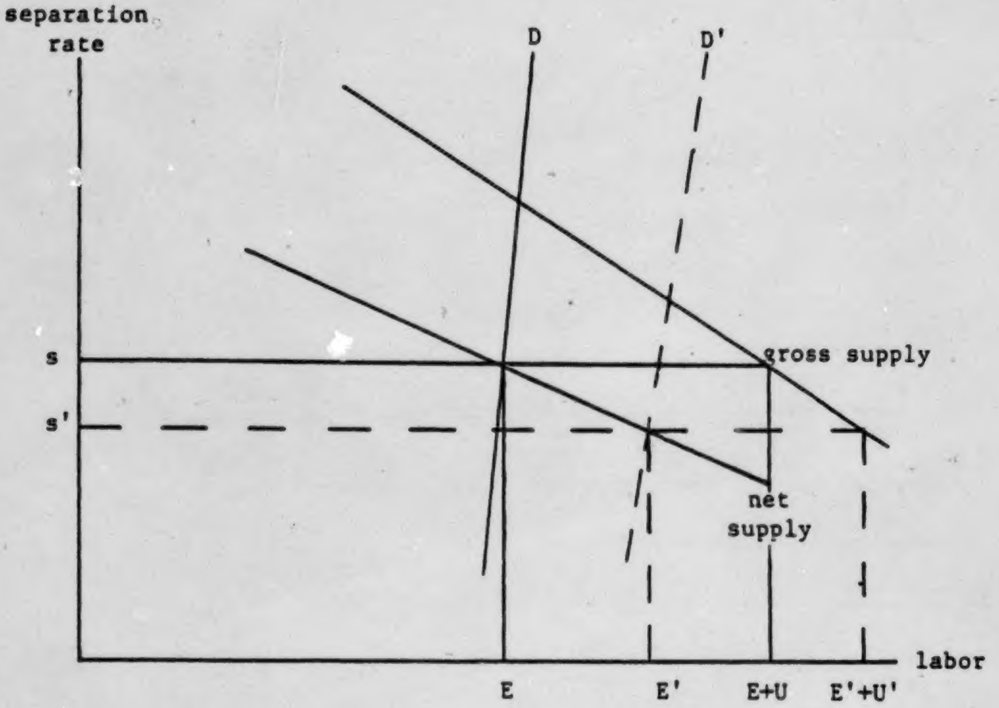
This can be portrayed in a somewhat unconventional supply-and-demand diagram:



The demand curve is shown as nearly vertical on the assumption that the benefits to the employer of higher turnover and the associated change in recruiting costs are not very large. On the other hand, gross labor supply may be reasonably sensitive to the separation rate--given the fixed wage rate, young workers will choose activities other than work in preference to the high unemployment rates that accompany high turnover rates. This is even more pronounced when supply is measured net of unemployment. Higher separation rates mean fewer workers are available for work at any one time, both because the work is less attractive and because more of their time is spent finding new work.

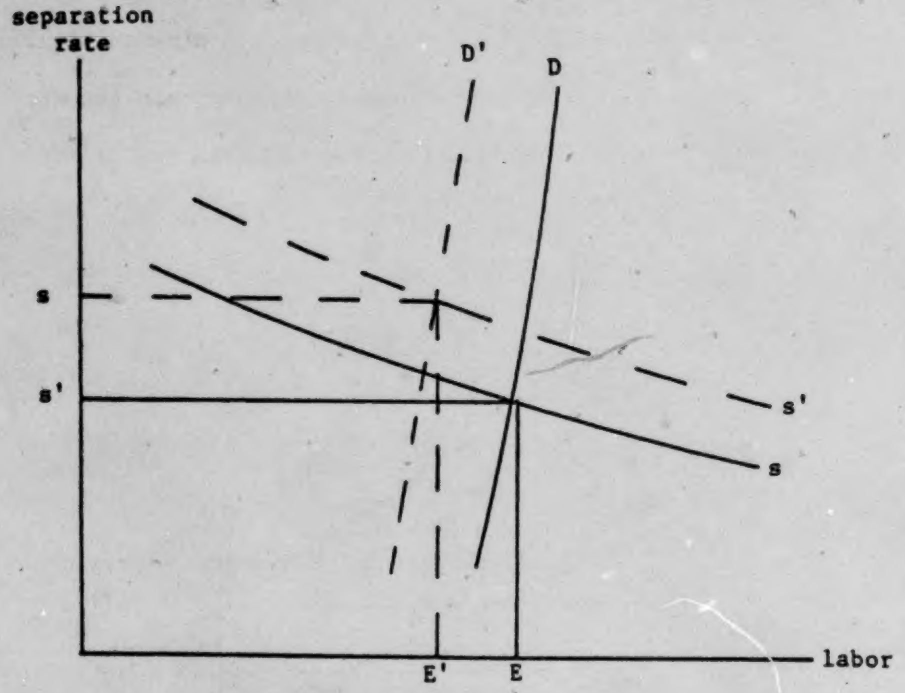
When the wage is held fixed by minimum wage legislation, the separation rate assumes the role of clearing the market. Equality of supply and demand is achieved subject to the constraint of the minimum wage; in this sense, the market is in equilibrium. It is important to note, however, that this equilibrium is not efficient. Because the minimum wage does not try to peg either the separation rate or the job-finding rate, private economic arrangements yield an efficient trade-off between the two. However, the minimum wage does interfere with the trade-off between the separation rate and the cash wage rate. Separation rates (and therefore unemployment rates) are excessive under the minimum wage because employers are prohibited from offering a set of employment terms with lower wages and longer jobs, even though those terms would make workers better off and reduce employers' costs at the same time.

In a labor market unaffected by the minimum wage, the separation and job-finding rates are largely unaffected by shifts in supply or demand. Unemployment remains at a fixed "natural" rate when, say, demand increases. The wage rises to clear the market. This analysis of a free labor market is amplified in my earlier paper. In the presence of a minimum wage, the impact of an increase in demand is rather different. Because the wage cannot respond, the separation rate falls as demand rises:

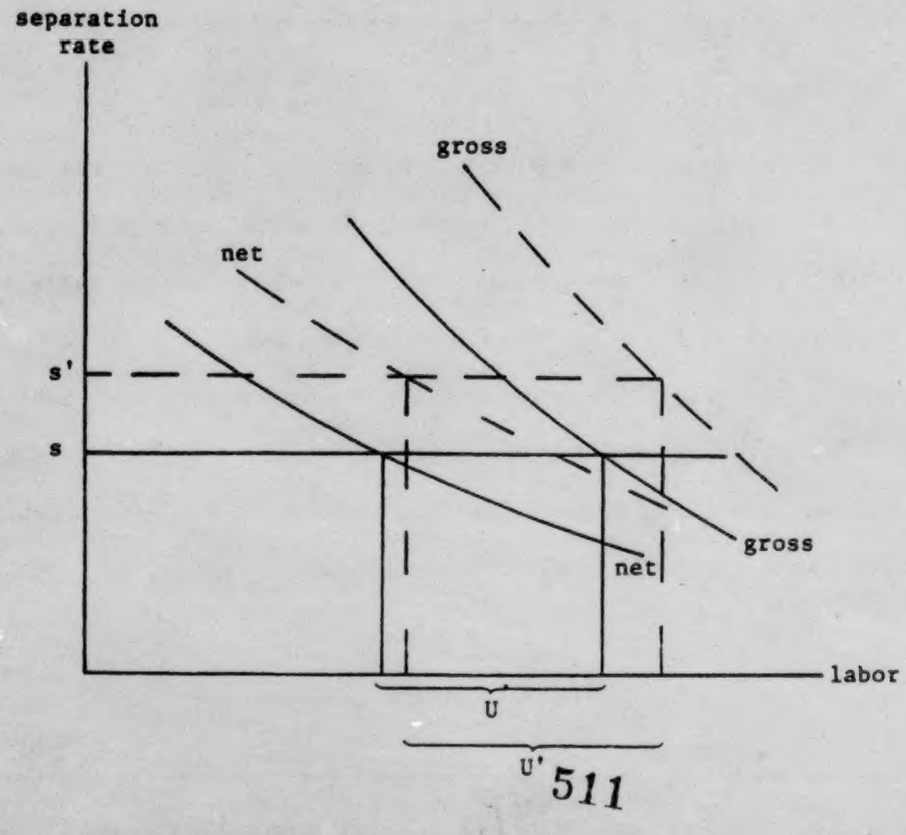


The increase in employment, from E to E', is somewhat less than the amount of the rightward shift of the demand curve (just as it would be if the wage were permitted to rise). Unemployment, which is held above the natural rate by the minimum wage, falls toward the natural rate.

The same apparatus will help to explain the effect of an increase in the minimum wage itself. For a given separation rate, a higher minimum wage means lower labor demand and higher net supply, so the demand schedule shifts to the left and the net supply schedule to the right:


separation rate
D'
D
s
s'
s'
s
E'
E
labor

The combination brings about a decrease in employment from E to E' and an increase in the separation rate from s to s'. Unemployment rises as well, as the following diagram shows:


separation rate
gross
net
s'
s
gross
net
labor
U
U'

511

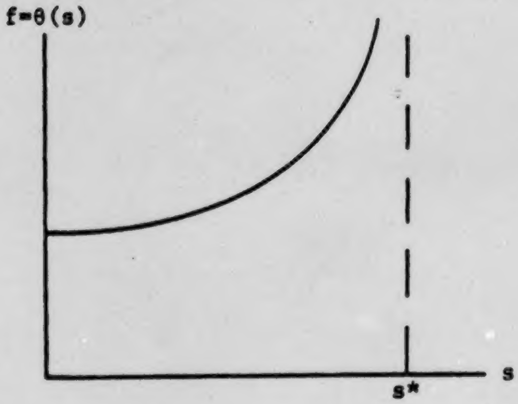
In the traditional analysis of the minimum wage, employment falls by the full amount of the downward shift in labor demand brought about by a higher minimum. Demand alone determines employment. The gap between supply and demand appears as unemployment. In the analysis presented here, the equilibrating role of the separation rate dampens the adverse effect of the minimum wage on employment. The rise in separations makes the labor market more attractive to employers and so helps to offset the disincentive of higher cash wages. A stricter minimum wage must raise unemployment, however. Most, or perhaps all, of the increase comes from higher turnover rather than from lower job-finding rates and longer duration of unemployment.

This conclusion is rather different from one reached by Finis Welch (1976). In a brief discussion of the theory of the effect of the minimum wage on unemployment, he concludes that it is ambiguous because the shortage of jobs will decrease turnover among those lucky enough to find work. Implicit in Welch's discussion is the belief that jobs terminate at the initiative of workers, and that employers would prefer lower turnover. This situation would represent a failure of the market to achieve an efficient turnover rate where workers and employers have equalized their trade-offs between turnover and other aspects of the employment bargain. Under the hypothesis of an efficient trade-off, pursued in this paper, it seems likely that turnover and unemployment are stimulated by a minimum wage.

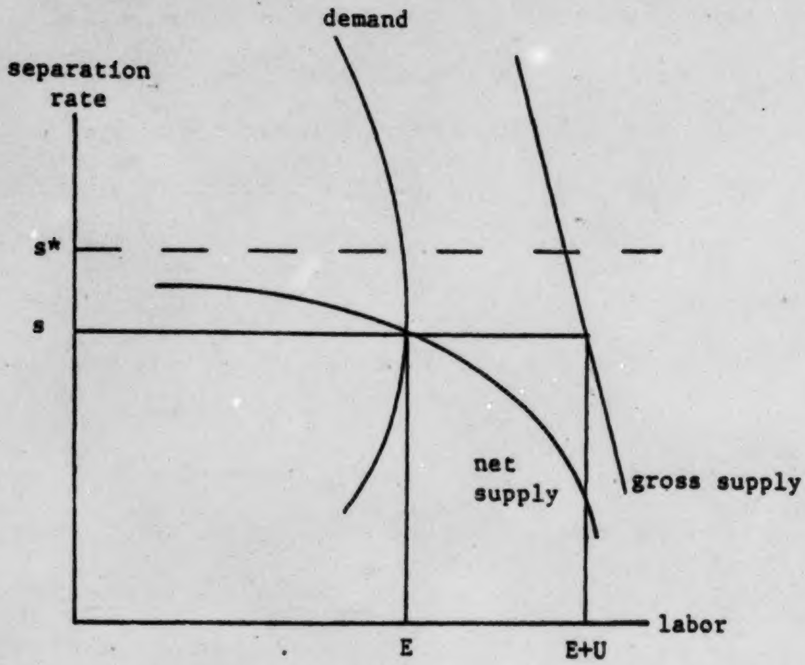
Another discussion of the effect of the minimum wage on unemployment appears in Mincer (1976). In his analysis, the job turnover rate is taken as constant, unaffected by the minimum wage. He does consider the influence of unemployment on labor supply.

Turnover and Labor Costs

All of the novelty in the previous section rests on the hypothesis that employers can operate at lower costs when turnover rates are higher, given a fixed hourly cash wage. To see this, consider the opposite case where turnover above a certain critical level is undesirable from the point of view of the employer. Since turnover is assumed always to be undesirable to the worker, efficient arrangements will never involve a separation rate above the critical level. In this case, the efficient job-finding rate, $f = \theta(s)$, will rise rapidly as the separation rate approaches the critical level (say, s^*):



The supply-and-demand diagram under a wage fixed by minimum wage legislation is, in this case,



Here the net supply curve bends far to the left of the gross supply curve because the job-finding rate drops rapidly as the separation rate approaches s*. If market equilibrium occurs at a separation rate near s*, it will involve high rates of unemployment in the traditional sense of a stagnant market: The unemployed will consist of people who are having a great deal of trouble finding jobs. The jobs they find eventually will last a reasonable length of time. This is the kind of influence of the minimum wage depicted in the standard analysis. To the extent that the minimum wage raises the wage above its full market-clearing level, it creates a shortage of jobs, and jobs are rationed among job-seekers by the increased difficulty in finding work.

My point in this paper is the theoretical and practical possibility that a minimum wage operates in the opposite way, to stimulate job turnover rather than to depress job-finding. The most convincing part of the case favoring this hypothesis is the evidence presented earlier of very high job separation rates and rapid flows of workers into jobs in markets influenced by the minimum wage. This section of the paper gives some further reasons to think that the minimum wage has most of its effect in raising job turnover.

First, it may be useful to exhibit a class of utility functions and cost functions where the efficient job-finding rate is literally constant, independent of the minimum wage, and, indeed, independent of the supply and demand for labor generally. Within this class, workers' concerns about separation rates and job-finding operate through the unemployment rate. In other words, a worker is indifferent between two labor markets where wages and unemployment are the same, but one has higher separation and higher job-finding rates than the other. It is also necessary to say something about workers' willingness to trade off cash earnings against unemployment, which will depend on the level of public unemployment insurance and workers' attitudes about the value of time spent out of work. A reasonable approximation is that there is a constant, λ, equal to 0 for workers who are indifferent between work and unemployment (either because of full unemployment insurance or high value of time in nonworking activities) and equal to 1 for workers for whom unemployment is a pure waste of time and who receive no unemployment insurance. Then a utility function capturing all of this is

$$w(1-\lambda u)$$

or, in terms of separation and job-finding rates,

$$w\left(1 - \lambda \frac{s}{s + f/(1-f)}\right)$$

The indifference curve along which workers achieve a certain level of satisfaction, say, y, can be written

$$s = \frac{f}{1-f} \; \frac{w-y}{y-(1-\lambda)}$$

On the cost side, it seems reasonable to approximate total cost as the sum of

1. costs not related to the type of labor under consideration, say, A.
2. regular hourly employment costs, say, aw.
3. recruiting costs, proportional to the rate at which jobs are filled, s, the effort required to fill one job, $\rho(f)$, and the hourly wage, w.

less

4. the benefit, say, bws, of the flexibility associated with the separation rate, net of training costs.

The resulting cost function has the form

$$C(w,s,f) = A + Bw\big(a + \rho(f)s - bs\big)$$

It is only a useful approximation over the range of separation rates where it is plausible that rising rates convey benefits to the firm, on net.

An efficient employment arrangement that yields a level of satisfaction y to each worker can be described mathematically as the minimum of cost subject to the constraint that utility equal y:

$$\min_{s,f} \; A + Bw\big(a + \rho(f)s - bs\big)$$

$$\text{subject to } s = \frac{f}{1-f} \; \frac{w-y}{y-(1-\lambda)w}$$

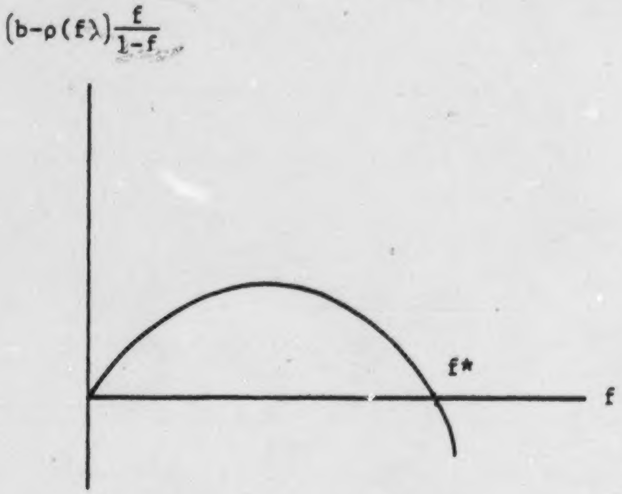
The minimum wage prevents achievement of the fully efficient arrangement, where the minimum would be taken over the wage rate as well. Now the constraint can be substituted into the minimand to restate the problem as

$$\min_{f} A + Bw\left[a - \left(\beta - \rho(f)\right) \frac{f}{1-f} \quad \frac{w-y}{y - (1- \ )w}\right]$$

But minimization of this over the job-finding rate, f, is equivalent to maximizing the expression

$$\left(b - \rho(f)\right) \frac{f}{1-f}$$

The maximum occurs somewhere between $f = 0$ and the critical job-finding rate, f*, where the recruiting costs, $\rho(f)$, begin to outweigh the net benefits of turnover, b:



The important point is that the efficient job-finding rate is determined by the narrow consideration of balancing the employer's benefits from turnover against the worker's costs. Both are proportional to the hourly wage, so the efficient job-finding rate is independent of the level at which the government sets the minimum wage. It is also independent of the level of satisfaction achieved by workers and so independent of the supply of and demand for labor.

It seems reasonable to expect that the efficient job-finding rate is fairly close to constant over a range of market conditions, even if the exact mathematical conditions set forth above do not hold. Obviously, the range includes only those separation rates where turnover has net benefits to employers. A sufficiently aggressive minimum wage will inevitably push the market close to the point where turnover becomes costly to employers, and the conventional analysis where the minimum creates a shortage of jobs will begin to apply. On the other hand, the effect of a minimum wage that pushes the cash wage only moderately above its equilibrium may well be to stimulate turnover rather than to depress job-finding.

The core of the argument that turnover can benefit employers, as I have emphasized earlier, is the flexibility that brief job commitments provide to employers. At the most basic level, the minimum wage induces turnover by inhibiting employers from holding overhead labor. Instead of paying a lower wage to long-term workers through thick or thin, employers subject to a minimum wage pay a high hourly wage to short-term workers who must finance themselves (at least partly) in times of slack. Only a tiny fraction of the fluctuations in demand that lie behind this process are aggregate--most affect just the firm itself. They are not necessarily purely random, either. A high-turnover employment policy makes it easier to accommodate seasonal swings in demand as well, for example.

Other adaptations to the minimum wage are more subtle and probably take longer to respond to changes in the minimum. The scope for taking advantage of a high-wage, high-turnover employment policy depends on the technical organization of work within a firm. Training costs must be low in order to benefit from high turnover. Jobs must be highly standardized.

The fast-food industry, which is a major source of employment at the minimum wage, is the leading example of this kind of adaptation. Workers can be trained in a few hours. They need not even memorize the prices of items on the menu because each item has a separate button on the cash register. Job turnover is a way of life in this industry, and the industry has learned to profit from it. Though obviously many forces have contributed to the evolution of the high-turnover practices of the fast-food industry, my suggestion here is that the minimum wage is important among them.

Achievement of the Efficient Job-Finding and Separation Rates within the Labor Market

The analysis of this paper pictures employers and workers agreeing on three aspects of the employment arrangement: the cash hourly wage, the separation rate, and the job-finding rate. Only the first of these is considered in the conventional analysis of employment bargains. Is it meaningful to speak of an agreement about separation or job-finding rates?

Job separation is under the joint control of the two parties to an employment arrangement. Separations can occur unilaterally as quits or layoffs. Alternatively, they may occur by prearrangement, as when a summer or other temporary job comes to an end. Evidence from the United States suggests that the latter case is particularly important for teenagers (Hall, 1978). In cases where there is no advance agreement about the duration of the job, there are generally understandings about how the job will come to an end. It is fairly easy for workers to find out the past layoff rates of employers and reasonable to assume that these are guides to the future. Similarly, employers can inquire about the employment histories of potential workers to avoid those who have deviated from the norm for the market. Though neither party gives up the right to bring about a separation unilaterally in any one instance, both face penalties for systematic departures from the prevailing employment terms.

Agreement about job-finding rates is a harder issue. A very general argument can be made that a market operating at an inefficient job-finding rate will be displaced by one operating at the efficient rate. In the second market, everyone can be made better off than in the first. But this leaves the important question unanswered about how the market determines its job-finding rate. This point is discussed in my earlier paper. A market operating away from the efficient job-finding rate presents arbitrage opportunities for an entrepreneur willing to offer employment at alternative, efficient terms and to sell his workers' services to employers. Temporary-employment firms could have exactly this function in clerical and other markets, though, of course, there are many other reasons for their existence as well. Alternatively, a market with an inefficient, high job-finding rate offers arbitrage profits to an employer who makes special efforts to advertise that jobs are readily available, but on terms favorable to the employer. As in the case of conventional supply-and-demand theory, the model presented in this paper does not provide a fully worked-out story of how the market moves toward its equilibrium, but restricts its attention to the equilibrium itself.

While this discussion may lend some plausibility to the notion that the market does move eventually to the efficient equilibrium, it seems unlikely that the process is a speedy one. In particular, the prediction that the effect of a higher minimum wage is to stimulate turnover rather than to make jobs harder to find is a prediction for the long run. In the short run, the minimum wage seems likely to push the market into disequilibrium with an inefficiently low job-finding rate. The resulting lags are a potential complication in any empirical analysis of the effect of the minimum wage.

Concluding Remarks

Jobs for young workers are readily available in the U.S. economy, in spite of minimum wage legislation that affects youth much more than any other segment of the labor force. Young workers find jobs just as fast as their older counterparts. The conventional analysis of the potential effects of a minimum wage suggests that it creates a shortage of jobs and so should make it more difficult for any one worker to find a job. Taken together, these constitute an apparent case against any important effect of the minimum wage. It seems that high unemployment rates of youths have to be blamed on something else.

This paper has shown that a minimum wage can bring about high unemployment without causing a shortage of jobs or reducing the job-finding rate. Rather, in the long run, an effective minimum wage can induce the evolution of employment practices and arrangements that raise turnover. The minimum wage does not block the market from achieving an efficient degree of tightness, that is, an efficiently high job-finding rate. In fact, under reasonable assumptions about turnover and recruiting costs, the efficient job-finding rate is a constant, unaffected by the minimum wage or the supply of and demand for labor. The adverse effects of the minimum wage are then concentrated in inefficiently high separation rates. The shockingly low average duration of jobs held by teenagers--less than three months--may be an important consequence of the minimum wage. If so, high unemployment among youths can be traced in part to the minimum wage, which makes them become unemployed too often even though it does not inhibit job-finding once they are unemployed.

References

Gertrude Bancroft and Stuart Garfinkle, "Job Mobility in 1961," Monthly Labor Review, August 1973.

Kim Clark and Lawrence Summers, "Labor Market Dynamics and Unemployment: A Reconsideration," Brookings Papers on Economic Activity, 1:1979, forthcoming.

Robert E. Hall, "A Theory of the Natural Unemployment Rate and the Duration of Employment," Journal of Monetary Economics, Vol. 5, pp. 1-17, April 1979.

Stephen Marston, "Employment Instability and High Unemployment Rates," Brookings Papers on Economic Activity, 1:1976, pp. 169-203.

Jacob Mincer, "Unemployment Effects of Minimum Wages," Journal of Political Economy, Vol. 84, pp. 87-104, August 1976.

Finis Welch, "Minimum Wage Legislation in the United States," in Orley Ashenfelter and James Blum (eds.), Evaluating the Labor-Market Effects of Social Programs, Industrial Relations Section, Princeton University, 1976, pp. 1-38.

HIGH SCHOOL PREPARATION
and
EARLY LABOR FORCE EXPERIENCE

by

Robert H. Meyer and David A. Wise

Many kinds of preparation and experience are presumed to prepare youth to find jobs, to do them, to keep them. At least three are often mentioned. One is general academic education -- reading, writing, arithmetic. A second is vocational training intended to develop the skills necessary to perform particular tasks. A third is work experience itself, emphasized as the way to learn what it's like to work, to acquire the habits and attitudes that persons who work have, that draw one to want to work, and that those who hire want to find in those they pay. Motivated by these common hopes, we have investigated the relationships between early labor force experience and the three kinds of high school preparation that emphasize them. The paper analyzes the relationship between high school curriculum, work experience, and academic achievement on the one hand and early labor force employment and wage rates on the other. We find that work experience while in high school is strongly related to later employment. Academic performance in high school is also related to successful labor market experience. But we find no significant effect of current forms of high school vocational training on early labor force experience. Thus the weight of our evidence implies that programs that emphasize work experience for youth,

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together with general academic education, have the greatest chance of enhancing their subsequent labor force experiences.

The analysis is based on male youth who graduated from high school. A large portion of young persons enter the labor force immediately upon graduation from high school. Many receive no further formal education. For these youth, as well as those who continue their education, high school preparation is a potentially important determinant of early labor force experience. Because the study is limited to high school graduates, its implications for high school dropouts must be indirect. Among all groups of youth, high school dropouts, and in particular black school dropouts, have the poorest labor force experiences. Nonetheless, labor force statistics suggest a high youth unemployment rate, even among high school graduates. And our results for high school graduates we think have strong implications for future generations of persons like those who now drop out, if these future generations were to remain in school.

The Analysis is based on data collected by the National Center for Educational Statistics through the National Longitudinal Study of 1972 High School Seniors. The Study collected a wide range of school, family background, attitude and aspiration information from approximately 23,000 high school seniors in the Spring of 1972. The 1972 base survey was based on a nation-wide sample of high schools, stratified in such a way that schools in lower socioeconomic areas were somewhat oversampled. In addition to the base survey, the Study included three follow-up surveys in 1973, 1974, and 1976. The follow-up surveys were used to obtain information on post-secondary school and work choices as well as labor force experiences.[1] Unlike most other data sources, this one allows us to follow a single cohort in their transition from school to work.

Most male youths in the years immediately after high school are either in the labor force or are attending a post-secondary school; some are in the labor force and going to school. Because the labor force aspirations of persons while they are students, their labor force behavior, their access to the labor market, and thus their realized experiences are likely to differ substantially from persons who are not in school, we have sought to obtain estimates that represent the experience that we would expect to find among persons not in school. To obtain such estimates, however, we must consider simultaneously both the decision to enter the labor force, rather than go to school, and the expected experience of those who enter the labor force. In a strictly statistical sense, this may be thought of as correcting for sample selection bias. But in our case, the determinants of school attendance, as well as the determinants of labor force experience, are of considerable substantive interest. In fact, the decision to attend school may be expected to be determined in part by expected labor force experience. Although our primary emphasis will be on labor force experience we will give some attention to the determinants of school attendance as well. The outline of the paper is preceded by a summary of our major findings.

We have found a strong relationship between hours of work while in high school and weeks worked per year upon graduation. Persons who work while in high school also receive higher hourly wage rates than those who don't. The combined effect on earnings is very substantial. For example, with other individual characteristics equal to the average in the sample, persons who worked 16 to 20 hours per week in high school are estimated to earn annually about 12 percent more than those who didn't work at all in high school. Depending upon the amount of work in high school and estimated weeks worked based on other characteristics, the estimated "effect" on annual earnings of high school work could be as high as 30 or 35 percent. On the other hand, we find almost no relationship between any measure of high school vocational training and later weeks worked or wage rates. This has led us to raise the possibility that programs that emphasize work experience in high school may well have a greater impact on later labor market experience than programs that emphasize job skill training without work experience. Our evidence, however, establishes only a strong correspondence between work while in high school and later employment; it cannot be used to infer a cause and effect relationship of the same magnitude.

Traditional measures of academic achievement are also positively related to early success in the labor market. In particular, class rank is related to both weeks worked after graduation and to wage rates, after controlling for test scores reflecting a combination of aptitude and achievement. Combined with the results on hours worked in high school, this implies to us a substantial carry-over to the labor market of individual attributes associated with or developed through work effort in and out of school. Class rank may also measure general academic knowledge. And together with the positive estimated effect of test scores on both weeks worked and wage rates implies a significant effect of traditional measures of academic aptitude and achievement on labor market performance upon leaving school. Thus both high school academic performance and work experience seem to dominate specific vocational training as preparation for successful early experience in the labor market.

In contrast to the lasting relationship between high school work experience on weeks worked and wage rates over the next four years, there is little relationship between random -- as distinct from individual specific -- determinants of weeks worked in the first year after graduation and weeks worked four years later, and little relationship between random determinants of wage rates upon graduation and wage rates four years later. After controlling for individual specific characteristics, we find little lasting effect of unusually few weeks worked in the first year or two on weeks worked three or four years later. Similarly, after controlling for individual specific terms, we find little lasting effect of random fluctuations in initial wage rates on wages four years later. Whatever the determinants of wages and weeks worked, other than individual specific attributes, they do not lead to long-run persistence of initial experience. (On the other hand, wage rates increase with job experience so that weeks not working contribute to lower wage rates in the future.) And much if not most of work while in high school, that has a substantial positive relation to later labor market experience, must have been on jobs with limited direct relation to future job ladders, although our data do not provide any indication of the quality of high school jobs. Thus our findings suggest that the oft-expressed worry that poor initial jobs and initial jobs without a future should be avoided, for fear that they will contribute to lasting poor labor force experience, may be misplaced. Our evidence on persons graduating from high school suggests, albeit indirectly, that this worry is unfounded and in fact should be dominated by policies to encourage early work experience, possibly without exaggerated initial concern for its relationship to a well defined hierarchy of future jobs. We find no evidence that persons on average were hindered by the work experience that they had in high school; on the contrary, the evidence suggests that they may well have been helped. And, our evidence is that low-wage jobs after graduation do not in themselves increase the likelihood of low wage jobs a few years hence.

We have distinguished weeks worked in the four years following high school by the year in which the experience was had. Thus after four years for example, we know how much an individual worked in each of the three preceding years. As expected, we find that wage rates at any given date are determined in part by previous experience. Thus although there is no lasting effect of non-employment in one year on employment in subsequent years, there is a cost associated with early non-employment; it is lower wages in future years. The effect of early labor force experience on subsequent wages is not obviously different in magnitude from the effect of work experience while in high school. But the effect of work experience while in high school does not decline over the first five years in the labor force, whereas there is some evidence that the effect of early labor force experience on subsequent wages may decline over time. Thus high school work experience may be capturing attributes that are in part at least distinct from those associated with later labor market experience. The pattern of the relationships between work while in high school and weeks worked in subsequent years in the labor force provides further evidence of this. Indeed the latter finding suggests strongly that high school work experience is associated with individual attributes that persist over time.

The average wage rates of whites and non-whites in the labor market are quite close, with whites earning a bit more per hour after the first year. But after controlling for other variables, non-whites seem to earn a bit more per hour than whites. On the other hand, non-whites work fewer weeks per year than whites on the average but we find little difference between the two groups after controlling for other variables. After controlling for other variables, the probability that non-whites are in school in each of the four years after high school is about 0.10 higher than the corresponding probability for whites.

In general, summary statistics based on the National Longitudinal Study do not suggest severe employment problems for these high school graduates. On the contrary, they suggest a group of persons moving rather smoothly into the labor force.

Finally, employment ratios of both white and non-white high school graduates based on these data are considerably higher than those calculated from Current Population Survey data, and unemployment rates much lower. Although employment ratios of non-whites are lower than those of whites, and unemployment rates higher, four years after high school graduation they are close. The October 1976 white employment ratio is .909 and the non-white ratio .875. Unemployment rates are .065 and .081 respectively. Very few persons in the sample are chronically out of school and unemployed.

The general outline of the paper is as follows: Section I contains some general descriptive statistics on the transition from school to work. Empirical estimates of weeks worked and wage equations are presented in Section II. They are accompanied by non-school attendance equations. Section III is an analysis of the extent of persistence of individual experience over time. Concluding remarks are contained in Section IV.

I. Some Descriptive Statistics on the Transition from School to Work.

Through the National Longitudinal Study of 1972 High School Seniors data were obtained on almost 23,000 persons from over 1,300 high schools. The high schools were a stratified sample of all public, private, and church affiliated schools in the country. To increase the number of "disadvantaged" students in the sample, high schools located in low income areas and schools with a high proportion of minority enrollment were sampled at approximately twice the sampling rate used for the other schools. The summary statistics reported below have not been adjusted to reflect population proportions. They are reported, however, for whites and non-whites separately. Both groups probably reflect more persons from low income families than would be found in a random sample of the population.

We will present summary statistics in three groups: the first on work and school status by year, the second on the likelihood of selected sequences of school and work status over time, and the third on weekly earnings and hours worked and annual employment and by year.

A. School and Work Status by Year.

The distribution of white and non-white males in the survey sample by school and work status, together with some summary labor force statistics, is shown in Table 1. (More detailed distributions by 9 school and 5 work classifications are presented for five consecutive Octobers beginning in 1972 in tables available from the authors.) We will point out first some general findings based on an examination of Table 1 and then indicate the kind of detail that can be found in the more detailed tables, without presenting an extensive discussion of it.

Table 1. Percent Male Youths in School and Work Categories, and Labor Force Statistics, by Year and Race, October of Each Year.

	White					Non-White				
	1972	1973	1974	1975	1976	1972	1973	1974	1975	1976
In School, Full-Time[a]	53.6	43.3	38.2	35.2	22.1	42.3	30.3	26.5	23.3	17.7
In School, Part-Time	4.6	7.2	6.2	6.6	7.7	4.4	7.4	6.5	7.4	7.0
Not in School, Total	42.4	49.5	55.7	58.2	70.2	53.3	62.3	67.1	69.4	75.3
Working Full-Time	71.9	76.2	74.1	77.5	80.1	60.1	67.7	63.3	68.7	71.9
Working Part-Time	9.2	5.1	4.9	4.2	4.1	11.4	6.2	5.1	5.2	5.1
Military	7.7	11.2	11.9	10.8	7.4	8.8	14.2	16.1	15.7	12.1
Out of Labor Force	6.6	4.5	2.3	2.7	2.7	9.0	6.2	2.9	3.1	4.1
Looking for Work	4.6	2.8	6.7	4.7	5.7	10.7	5.8	12.6	7.3	6.9
Labor Force Statistics:[b]										
Employment Ratio	.880	.914	.898	.916	.909	.784	.860	.840	.877	.875
Labor Force Participation	.929	.946	.974	.969	.972	.902	.928	.965	.964	.953
Unemployment Ratio	.053	.035	.079	.053	.065	.130	.073	.155	.090	.081

a. Includes a small number of persons in graduate school in 1975 and 1976.

b. For persons not in school and not in the military.

The most striking statistics in Table 1 are the comparatively low unemployment rates and high employment ratios, as compared with those based on Current Population Survey data. (See Freeman and Medoff [this volume].) Although we cannot provide a direct comparison for each October, we can for 1972. In October of 1972, the Census Bureau conducted a special survey of Spring 1972 high school graduates. (See Bureau of Labor Statistics [1973], p. 27.) A comparison of unemployment and other labor force statistics based on the two data sources is presented in the tabulation below (for persons not in school).

Statistic	National Longitudinal Study		Current Population Survey, October 1972	
	White	Non-White	White	Non-White
Employment Ratio	.880	.784	.815	.680
Labor Force Participation	.929	.902	.916	.880
Unemployment Rate	.054	.130	.110	.227

An investigation of the definitions used in the two surveys does not reveal any differences that would suggest such apparently contradictory results, although the survey questions are not identical. Although the NLS survey is weighted to oversample low income youth, this should tend to raise implied unemployment rates, not to lower them. The survey respondent, however, is the individual youth in the NLS survey, but is likely to be the mother or father of the youth in the CPS survey. The NLS data is collected through a mailed questionnaire (together with some mail and telephone reminders), while the CPS data is obtained by interview with a household member, often the female head. Freeman and Medoff find that a large portion of the difference between the CPS numbers and those based on the Parnes National Longitudinal Survey can be attributed to the different respondents.

The summary statistics also reveal several differences between white and non-white youth. The percent of white youth in school full-time is approximately 12 percentage points higher than the percent of non-whites until 1976, when many youth would have finished four years of college. Of those not in school, the percent working full-time is about 8 to 10 points higher for whites than for non-whites. By 1976, the percentages were about 80 and 72 respectively. The proportions working part-time do not differ substantially in any of the years, although in each year the percent for non-whites is somewhat higher than for whites. It declines between 1972 and 1976 from 9.2 to 4.1 for whites and from 11.4 to 5.1 for non-whites. A larger proportion of non-whites than whites are in the military. In 1974, the year of highest military participation for both groups, about 12 percent of whites and 16 percent of non-whites were in the armed forces.

More blacks than whites are out of the labor force, but the differences are not large. The proportion "looking for work," however, is about twice as high for non-whites as for whites in 1972 through 1974. The differences decline in 1975 and 1976. The percent of whites looking for work in 1976 was 5.7, versus 6.9 for non-whites.

The labor force participation rates are high for both groups and do not differ substantially. Between 1972 and 1976 they moved from .93 to .97 for whites and .90 to .95 for non-whites. The employment ratio is higher for whites than non-whites in 1972, .88 versus .78; but by 1976 the two ratios were much closer, .91 versus .88. This closing of the gap between the two groups is reflected in the unemployment rate which was more than twice as high for non-whites as for whites in 1972;

but by 1976, the two rates were rather close, .065 versus .081.

In short, these numbers suggest a cohort of youth moving rather smoothly into the labor force. Although there are differences between the statistics for whites and non-whites, they do not seem to us to be striking. In particular, the unemployment rates, although higher for non-whites than whites, are not shocking to us for either group in any year. By 1976, somewhat more than four years after graduation from high school, labor force participation and employment ratios are high for both groups and the unemployment rates are modest for both groups. Youth unemployment does not appear from these data to be a severe problem for this group of high school graduates.

From the statistics in the tables available from the authors, one can find more detail within this more general picture. For example, it can be seen that most youth who are working part-time are also in school full-time, although the proportion is lower for non-whites than for whites. Also, many persons looking for work are full-time students. They were not included in the unemployment statistics reported above.

B. Sequences of School and Work Status.

The average statistics reported above do not reveal extremely high unemployment rates. But it could be that there are some youth who are often unemployed. As a worst case, we have lumped together the persons out of the labor force with those who are unemployed. In Table 2 are reported the percent of persons not in school and not working (in either civilian or military jobs) for each possible number and sequence of time periods. For example, the sequence 10101 indicates not in school and not working in October 1972, October 1974, and October 1976; but not in this category in October 1973 nor in October 1975. The left digit pertains to 1972.

Examination of Table 2 reveals that 81 percent of the sample were not in this category in any of the five October periods. (The data pertain to the first full week in October of each year.) Only one-tenth of one percent were out of school and not working in all of the periods.[2] For whites and non-whites together, this represents 5 persons out of 9115. Three-tenths of one percent were in this category 4 out of the 5 periods, and one-tenth of one percent in 3 out of the 5. Only 14 percent were so classified in 1 of the 5 periods. We do not find a large group of chronically not in school and not working youth. More non-whites than whites were in this status for one, two, three, and four periods; but over 72 percent of non-whites were never out of school and without work in these October periods. These data do suggest, however, that some youth are much more likely to be in this category than others; there is heterogeneity among the group. For example, based on Table 1, about 5 percent of white youngsters are in this category in any year. If a person had a .05 probability of being in this category in any period and the probabilities were independent over time, the likelihood of being in this status three out of the five periods, for example, would be only .001, much less than the observed proportion of .008 for all white males.

Similarly defined sequences and associated percentages for full-time school and full-time work are reported in Tables 3 and 4 respectively. Table 3 figures reveal that 36 percent of the sample were never in school full-time, 35 percent for whites and 44 percent for non-whites. (While these numbers suggest that whites are more often in school than non-whites; the estimates below of the probability of attending school suggest a higher probability for non-whites than whites, after controlling for other relevant variables such as test scores and family background.)

Although there is some movement into and out of school, it is not the norm. Of persons who go to school at all, 69 percent begin in the first year after high school and attend only in consecutive years. Eighty-four percent of those who attend at all, attend during the year immediately after high school. The in and out possibility that is sometimes emphasized, possibly more often for older persons, is not the norm among this group.

While 36 percent of the sample were never in school full-time, only 24 percent worked full-time in each of the five periods, as can be seen in Table 4. As could be inferred from the school attendance figures, we see in Table 4, that a relatively large number of persons work the last 4, the last 3, the last 2, or the last year; but none of the prior years.

Table 2. Percent of Male Youths Not in School and Not Working, October 1972-76, by Sequence and Race [c]

Sequence	Percent of Total					
	All Males		White		Non-White	
11111	0.1	0.1	0.1	0.1	0.1	0.1
11110	0.3	0.1	0.1	0.0	0.5	0.3
11101		0.0		0.0		0.1
11011		0.0		0.0		0.0
10111		0.0		0.0		0.1
01111		0.1		0.1		0.4
11100	1.0	0.2	0.8	0.1	2.0	0.6
01110		0.1		0.1		0.1
00111		0.2		0.2		0.5
11010		0.0		0.0		0.0
11001		0.1		0.1		0.3
01101		0.0		0.0		0.0
10110		0.1		0.0		0.2
10011		0.1		0.1		0.3
01011		0.1		0.1		0.1
10101		0.0		0.1		0.0
11000	3.1	0.6	3.1	0.6	6.3	1.0
01100		0.5		0.0		1.0
00110		0.5		0.4		0.9
00011		0.5		0.0		0.7
10100		0.3		0.3		0.4
01010		0.1		0.1		0.1
00101		0.4		0.3		0.9
10010		0.2		0.1		0.5
01001		0.2		0.2		0.4
10001		0.2		0.2		0.3
10000	14.1	3.1	13.2	2.3	18.6	5.4
01000		1.9		1.8		2.5
00100		2.7		2.5		3.9
00010		2.5		2.3		3.2
00001		3.9		3.9		3.7
00000	81.0	81.0	82.7	82.7	72.2	72.2
Total		9115		7639		1475
Missing		2052		1448		522

c. The percents have been rounded to the nearest tenth. Differences between the sum of the numbers in the groups and the group totals reported to the left in each column are due to rounding. A "1" indicates not in school and not working. The left digit pertains to October 1972.

Table 3. Percent of Male Youths in School Full-Time, October 1972-76, by Sequence and Race[d]

Sequence	Percent of Total		
	All Males	White	Non-White
11111	11.7	12.4	8.1
11110	12.1	13.2	6.3
11101	1.3	1.3	1.2
11011	1.2	1.1	0.6
10111	1.2	1.2	1.3
01111	1.0	1.0	1.0
11100	3.8	3.9	3.3
01110	0.6	0.6	0.4
00111	0.5	0.5	0.5
11010	0.8	0.8	0.5
11001	0.4	0.5	0.3
01101	0.2	0.2	0.1
10110	1.1	1.1	0.9
10011	0.6	0.6	0.5
01011	0.2	0.2	0.1
10101	0.2	0.2	0.2
11000	7.1	7.0	7.3
01100	0.9	0.9	0.8
00110	0.5	0.5	0.7
00011	0.8	0.7	1.0
10100	1.2	1.1	1.2
01010	0.1	0.1	0.1
00101	0.1	0.1	0.1
10010	0.7	0.7	0.6
01001	0.1	0.1	0.1
10001	0.6	0.6	0.7
10000	9.5	9.2	11.2
01000	1.6	1.6	1.7
00100	1.5	1.4	1.9
00010	1.1	1.0	1.5
00001	1.3	1.2	2.0
00000	36.4	34.9	44.0
Total	9152	7659	1492
Missing	2052	1428	505

d. The percents have been rounded to the nearest tenth. Differences between the sum of the numbers in the groups and the group totals reported to the left in each column are due to rounding. A "1" indicates in school full-time. The left digit pertains to October 1972.

Table 4. Percent of Male Youths Working Full-Time, October 1972-76, by Sequence and Race [e]

Sequence	Percent of Total		
	All Males	White	Non-White
11111	23.7	23.7	24.1
11110	1.5	1.6	1.3
11101	1.2	1.1	1.5
11011	2.8	2.7	2.9
10111	2.9	2.9	3.2
01111	9.7	9.5	10.7
11100	1.0	0.9	1.5
01110	1.0	1.0	1.3
00111	7.6	7.2	9.7
11010	0.4	0.3	0.6
11001	0.8	0.8	0.9
01101	0.7	0.7	1.0
10110	0.5	0.4	0.9
10011	1.2	1.2	1.3
01011	1.8	1.7	2.1
10101	0.3	0.3	0.5
11000	1.0	0.9	1.2
01100	0.7	0.6	0.7
00110	1.3	1.3	1.2
00011	4.5	4.3	5.5
10100	0.4	0.4	0.3
01010	0.3	0.3	0.4
00101	1.4	1.4	1.4
10010	0.2	0.2	0.3
01001	0.9	0.9	0.9
10001	0.7	0.7	0.7
10000	1.2	1.2	1.3
01000	1.6	1.5	1.8
00100	1.6	1.6	1.4
00010	1.5	1.5	1.6
00001	9.9	10.6	6.5
00000	15.6	16.4	11.4
Total	9208	7689	1518
Missing	1959	1398	479

e. The percents have been rounded to the nearest tenth. Differences between the sum of the numbers in the groups and the group totals reported to the left in each column are due to rounding. A "1" indicates working full-time. The left digit pertains to October 1972.

C. Weekly Earnings and Hours, Annual Employment and Unemployment, and Number of Employers.

Average hourly wage rates, weekly earnings and weekly hours worked for persons not in school and for those in school are shown in Table 5. They cover all persons in the sample who were working in the first full week of October of the year indicated. Persons working full-time or part-time are included. For persons out of school, wage rates for the two groups are virtually identical right after graduation. After four years, whites earn about 6 percent more per hour than non-whites, presumably due in part at least to the different schooling patterns of the two groups and post-high school work experience. Non-whites also work about 2 hours per week less than whites in each of the time periods and thus have lower weekly earnings -- about 8 percent in the first year and 10 or 11 percent in each of the subsequent years.

On the other hand, non-whites who are in school work 1.5 to 3 hours per week more than whites, earn somewhat more per hour in all but the last period, and have higher weekly earnings in each of the periods -- between 5 and 19 percent depending on the period.

We also calculated the percent of persons with wage rates below the Federal minimum. The results for October of each year are shown in the tabulation below. These numbers presumably reflect in large part

		Percent Below Minimum		
Year	Minimum Wage Rate	Total	White	Non-White
1972	$1.60	10.98	11.02	10.76
1973	$1.60	5.89	5.93	5.59
1974	$2.00	8.06	8.35	6.68
1975	$2.10	8.14	8.14	7.99
1976	$2.30	5.76	5.39	7.73

Table 5. Average Hourly Wage Rates, Weekly Earnings, and Weekly Hours Worked for Persons Working in October, by School Status, Race, and Year.[f]

Item and Race	Out of School					In School				
	1972	1973	1974	1975	1976	1972	1973	1974	1975	1976
Hourly Wage Rate										
All Males	2.67 (3040)	3.18 (3752)	3.69 (4199)	4.14 (4039)	4.56 (4950)	2.34 (2153)	2.66 (2223)	3.06 (1892)	3.49 (1725)	4.04 (1347)
White	2.68 (2471)	3.22 (3001)	3.73 (3403)	4.17 (3271)	4.61 (4097)	2.34 (1866)	2.65 (1938)	3.00 (1625)	3.47 (1473)	4.06 (1162)
Non-White	2.67 (550)	3.02 (731)	3.53 (796)	3.99 (753)	4.35 (841)	2.49 (276)	2.74 (273)	3.42 (267)	3.59 (248)	3.91 (181)
Weekly Earnings										
All Males	108.68	133.61	154.21	173.48	192.15	62.96	74.34	89.25	103.77	130.80
White	110.32	137.04	157.41	176.47	195.52	61.85	73.43	86.94	101.47	129.74
Non-White	101.69	119.79	140.53	160.85	176.18	69.29	78.93	103.29	115.99	136.48
Weekly Hours Worked										
All Males	41.50	42.79	42.47	42.53	42.63	26.83	27.47	27.95	28.88	31.45
White	41.90	43.21	42.80	42.86	42.95	26.57	27.24	27.58	28.39	31.06
Non-White	39.65	41.14	41.02	41.09	41.09	28.09	28.62	30.20	31.60	33.73

f. The data pertain to the first full week in October of each year. The numbers reporting figures in each year are in parenthesis under the wage rates. They are the same for weekly earnings and weekly hours worked.

Table 6. Average Annual Weeks Worked, Weeks Looking for Work, Weeks Out of the Labor Force, and Number of Employers, for Male Youths, by School Status, Race, and Year.[g]

Item and Race	Out of School				In School			
	1972-73	1973-74	1974-75	1975-76	1972-73	1973-74	1974-75	1975-76
Weeks Worked								
All Males	39.91 (4374)	43.32 (4214)	43.66 (5031)	44.08 (5470)	28.17 (5541)	30.03 (4253)	30.82 (3923)	31.55 (3708)
White	41.05 (3433)	44.18 (3364)	44.26 (4087)	44.52 (4424)	28.55 (4742)	30.22 (3703)	30.86 (3432)	31.54 (3236)
Non-White	35.77 (899)	39.91 (850)	41.05 (944)	42.14 (1030)	25.70 (779)	28.78 (549)	30.58 (490)	31.60 (463)
Weeks Looking for								
All Males	3.57 (3960)	3.00 (3941)	3.78 (5061)	3.51 (5470)	2.21 (5140)	2.16 (3987)	2.77 (3913)	2.90 (3730)
White	3.06 (3112)	2.77 (3158)	3.60 (4091)	3.42 (4411)	1.98 (4438)	1.99 (3462)	2.59 (3418)	2.75 (3251)
Non-White	5.55 (807)	3.93 (783)	4.54 (970)	3.88 (1042)	3.70 (683)	3.25 (524)	4.03 (494)	3.92 (470)
Weeks Out of the Labor Force								
All Males	8.39 (3925)	5.86 (3899)	4.47 (4898)	4.25 (5313)	21.73 (5093)	20.04 (3948)	18.41 (3815)	17.58 (3646)
White	7.72 (3089)	5.17 (3131)	4.02 (3980)	3.89 (4303)	21.59 (4408)	20.00 (3431)	18.59 (3339)	17.71 (3186)
Non-White	10.79 (795)	8.66 (768)	6.39 (918)	5.84 (994)	22.84 (276)	20.32 (516)	17.09 (475)	16.63 (451)

(continued)

Table 6. Average Annual Weeks Worked, Weeks Looking for Work, Weeks Out of the Labor Force, and Number of Employers, for Male Youths, by School Status, Race, and Year,[g] completed)

Item and Race	Out of School				In School			
	1972-73	1973-74	1974-75	1975-76	1972-73	1973-74	1974-75	1975-76
Number of Employers								
All Males	1.85 (4342)	1.59 (4409)	1.43 (5306)	1.41 (5732)	1.76 (5496)	1.64 (4399)	1.43 (4019)	1.56 (3837)
White	1.89 (3418)	1.60 (3509)	1.43 (4290)	1.41 (4611)	1.78 (4726)	1.67 (3822)	1.43 (3503)	1.57 (3335)
Non-White	1.72 (884)	1.55 (900)	1.43 (1016)	1.41 (1105)	1.66 (748)	1.46 (576)	1.43 (515)	1.47 (493)

g. The number of respondents is shown in parenthesis under each average. The numbers for non-white and white may not add to the total because race is sometimes unknown.

wages of persons in jobs exempt from minimum wage legislation.

Average annual weeks worked, weeks looking, weeks out of the labor force, and number of employers, by school status, are shown in Table 6. Among persons out of school, non-whites work fewer weeks per year than whites, but the difference declines continuously over the four-year period. Non-whites work 13 percent less in the first year, 10 percent in the second, 7 percent in the third, and 5 percent in the fourth. The differences are accounted for by both weeks looking for work and weeks out of the labor force. Differences among whites and non-whites in school are somewhat less in general, although as among persons not in school non-whites who are in school spend more weeks than whites looking for work.

II. High School Training and Labor Force Experience

Our goal is to estimate the effects of personal characteristics, particularly high school preparation, on labor force experiences in the years following high school graduation. The measures of labor force experience we shall use are weeks worked and wage rates. We have annual weeks worked for four years following high school graduation and wage rates for five consecutive October periods, as described above. We have estimated a week's worked equation separately for each of the four years and a separate wage equation for each of the five October periods. Jointly with each of the weeks worked and wage equations we have estimated a "school non-attendance" equation. That is, the probability of being in the sample, and thus having recorded wage or weeks worked measures as defined below. We have followed this procedure in the first instance to correct for possible bias in the parameters of the weeks worked and wage equations. But the non-school attendance equations have a behavioral interpretation in this case and the associated parameter estimates are of interest distinct from their relationship to the weeks worked and wage equation estimates. In addition, the procedure we have used to estimate weeks worked accounts for the upper limit of 52 weeks in a year. A large proportion of respondents report working a full 52-week year. Parameter estimates obtained without recognizing this limit tend to underestimate the effects of explanatory variables on weeks worked. (An analogy would be the effect of knowledge about a subject on an examination score in that subject if the exam is very easy. After some level of knowledge, more doesn't help. You can't score above 100.) Thus we have combined a Tobit specification for weeks worked with a Probit non-school attendance specification. Finally, in Section III, we shall discuss the relationships between weeks worked and wage rates over time.

A more precise description of the approach we have followed to estimate weeks worked is presented in Section A below. The variant of this procedure used to estimate wages is described in Section B. The results are then discussed in turn, beginning with estimates of the probability of school attendance, followed by parameter estimates for the weeks worked and wage rate equations.

A. The Weeks Worked Estimation Procedure

Suppose that weeks worked in each of 4 years are indicated by Y_1 through Y_4. Assume also that in each period there are vectors of "exogenous" variables X_1 through X_4. In practice, these vectors will be composed largely of variables like test scores and family background that do not change over time, although some like schooling and work experience do. Let the relationships between weeks worked and the exogenous variables for individuals in the population, should they decide to work, be described by,

$$
\begin{aligned}
Y_{1i} &= X_{1i}\beta_1 + \varepsilon_{1i}, \\
Y_{2i} &= X_{1i}\beta_2 + \varepsilon_{2i}, \\
&\vdots \\
Y_{4i} &= X_{4i}\beta_4 + \varepsilon_{4i},
\end{aligned}
\tag{1}
$$

where the ε_{ti} are random terms and the β_t vectors of parameters. It is important in our case that the β_t be allowed to vary. We-do not want to restrict the influence of variables like high school work experience to be constant over time. On the contrary, we would like to see if their effects change, and if so, how.

Two groups of individuals are distinguished -- those who are in school and those who are not. Persons included in our out of school group were not in school in either the October beginning the year, nor in the following October. Although one might well consider the determinants of weeks worked for persons in either group, we will concentrate on those not in school. We judged that the labor market behavior of the two groups would be quite different and we did not want estimates that confounded the decisions of both.[3] Each of the equations (1) is presumed to describe the work experience of persons in the population should they decide not to go to school in the year indicated by the subscripts 1 through 4.

Suppose that there are four unobserved variables S_t, one for each of the four time periods. Define them by

$$
\begin{aligned}
S_{1i} &= Z_{1i}\delta_1 + \eta_{1i}, \\
S_{2i} &= Z_{2i}\delta_2 + \eta_{2i}, \\
&\vdots \\
S_{4i} &= Z_{3i}\delta_4 + \eta_{4i},
\end{aligned} \qquad (2)
$$

where the Z_t are vectors of exogenous variables, the δ_t are vectors of parameters, and the η_t are random terms. Let s_{ti} be an indicator variable with $s_{ti} = 1$ if the i^{th} individual is not in school in year t, and thus in the sample, $s_{ti} = 0$ if he is. Also, let

$$s_{ti} = \begin{cases} 1 \text{ if } S_{ti} \geq 0 \\ 0 \text{ if } S_{ti} < 0 \end{cases}, \tag{3}$$

for t equal to 1, 2, 3 or 4. Then the probability that the i^{th} individual is not in school is given by $Pr(s_{ti} = 1) = Pr(S_{ti} = Z_{ti}\delta_t + \eta_{ti} \geq 0)$. And if η_{ti} is assumed to be normally distributed, we have for each period a probit specification of the probability of not being in school:[4]

$$\begin{aligned} Pr\ (s_{1i} = 1) &= \Phi[Z_{1i}\delta_1] \\ Pr\ (s_{2i} = 1) &= \Phi[Z_{2i}\delta_2] \\ &\vdots \\ Pr\ (s_{4i} = 1) &= \Phi[Z_{4i}\delta_4] \end{aligned} \tag{4}$$

We know that estimation of any of the Y_{ti} equations in (1), based only on persons not in school in year t, will yield biased coefficient estimates if ε_{ti} and η_{ti} are correlated.[5] We could correct for this potential bias by estimating jointly for each year the weeks worked equation and the corresponding choice-of-status, or school attendance, equation.[6]

In our case, however, the upper limit on weeks worked has an important effect on the estimates of β in equation (1) and thus on the interpretation of the relationship between preparation in high school and post-high school labor force experience. The percent distribution of weeks worked for persons not in school by selected interval is shown for each of the four years in the tabulation below. The

Weeks Worked Interval	Percent Distribution 1973	1974	1975	1976
0 to 10	5.2	5.3	4.6	4.6
11 to 20	4.8	3.1	3.6	3.5
21 to 30	8.0	5.9	5.7	5.5
31 to 40	12.5	12.0	9.9	10.2
41 to 51	30.3	32.3	24.2	24.7
52	39.2	41.4	52.0	51.5

percent reporting fifty-two weeks of work ranges from 39 in 1973 to 52 in 1976. It is apparently the case that many persons are prepared to work, and have work opportunities, that exceed the time available constraint as measured in weeks.[7]

Thus we have changed the specification in equation (1), interpreting capital Y_i as an unobserved "propensity" to work, with observed weeks worked given by,

$$
(5)\qquad
\begin{aligned}
y_{1i} &= \begin{cases} X_{1i}\beta_1 + \varepsilon_{1i} & \text{if } X_{1i}\beta_1 + \varepsilon_{1i} \leq 52, \\ 52 & \text{if } X_{1i}\beta_1 + \varepsilon_{1i} > 52, \end{cases} \\
&\ \ \vdots \\
y_{4i} &= \begin{cases} X_{4i}\beta_4 + \varepsilon_{4i} & \text{if } X_{4i}\beta_4 + \varepsilon_{4i} \leq 52, \\ 52 & \text{if } X_{4i}\beta_4 + \varepsilon_{4i} > 52. \end{cases}
\end{aligned}
$$

The maximum likelihood procedure we have used estimates β in (5) jointly with δ in (2), for each of the four years individually. It is explained in more detail in Appendix A. The relationship between the expected value of Y given by $X\beta$ and the expected value of weeks worked, $E(y)$, may be seen in the figure below, in which one right-hand variable is assumed.

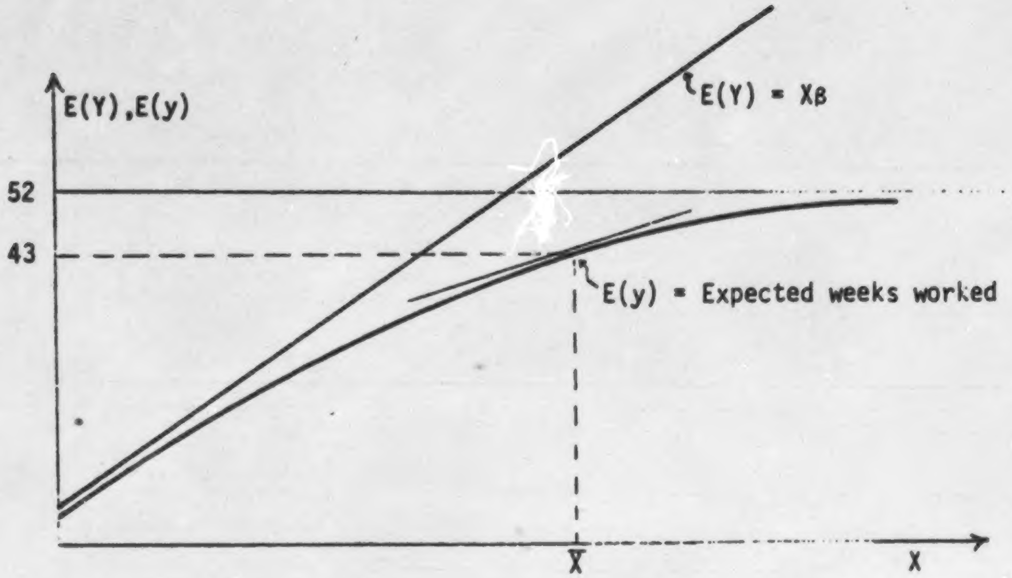

Figure 1

At low levels of Xβ, the estimated parameter β represents the approximate effect of a change in X on the expected number of weeks worked. As X increases, its effect on weeks worked approaches zero.[8] For example, our results reported below suggest that β is about twice as large as the derivative of E(y) with respect to X, evaluated at $\bar{X}$. At the mean of the variables in our sample, the expected number of weeks worked is about 44, and the expected value of the unobserved Y is somewhat greater than 52. The derivative of E(y) with respect to X at $\bar{X}$ is approximately equal to the estimate of β from a specification that does not distinguish employment at the limit of 52 weeks from observations below 52.

There were also a few persons each year who did not work at all. We obtained some initial estimates that accounted for this by specifying weeks worked to be bounded at zero, as well as 52. It did not significantly affect our results and we did not incorporate it in the results presented below.

An alternative to separate estimates for each year is to divide the sample into two groups: one composed of persons who were never in school, and the other composed of everyone else. But for our purposes the procedure outlined above has at least two advantages over this one. First, it allows us to make use of as much of the data as possible.[9] Examination of Table 3 shows that the number of persons out of school in all years is much smaller than the number in any single year.[10] Also, even if the group with weeks worked is defined in the alternative way, a sample selection correction must still be made to obtain unbiased estimates of the population parameters in the weeks worked equations. This presumably would be done by estimating a probit equation pertaining to the probability of never being in school. Such an equation could be used to correct each of the weeks worked equations for the sample selection bias.[11] But it is difficult to think of a behavioral interpretation for this sample selection equation, since in a given year one group includes persons who are in school as well as some who are not. Our status equations can be interpreted in each year as estimating the determinants of school attendance in that year.

B. The Wage Rate Estimation Procedure

Wage rate equations were also estimated jointly with non-school attendance equations. There are five wage equations, however, one for each of the October survey periods. But there is no limit problem as with weeks worked. Parameters in equations like (1) and (2) for weeks worked were estimated jointly, with the logarithm of the wage substituted for weeks worked.[12] There is, however, a complication that does not arise in the weeks worked equation.

Wage rates are presumed to depend on years of schooling, as well as other variables. For example, persons who were working in the fourth October period may have been in school during some or all of the previous periods, and their wage rates may be expected to depend on the amount of schooling. Suppose that the logarithm of the wage is given by,

$$W_{4i} = X_{4i}\alpha_4 + a_1A_{1i} + a_2A_{2i} + a_3A_{3i} + \nu_{4i} ,$$

where A_1 equals 1 if individual i was in school during period 1 and zero if not, and similarly for A_2 and A_3. The potential bias resulting from the possibility that $E(\nu_{4i}|s_{4i} = 1)$ may not be zero is corrected for by estimating the equation jointly with the probability of non-school attendance. But if the ν_t's are correlated with the error in the non-school attendance equations, and the η_t's or the ν_t's are correlated over time, then A_1 through A_3 may be correlated with the error ν_4 in the wage equation. To overcome this problem, we experimented with an instrument for prior schooling.[13] In practice, we found that the use of an instrument for schooling did not substantially alter the character of our conclusions.[14] A similar problem may pertain to work experience that is also assumed to determine the wage rate. We did not attempt to correct for it. (In subsequent work we will estimate a more appropriate model for solving this problem. It will allow joint estimation of weeks worked, wage, schooling, and a sample selection equation.)

Finally, the sample selection equations estimated with the wage rate equations are not precisely non-school attendance equations, although in practice the two are almost interchangeable. The weeks worked equation for a given year included all persons who were not in school during that year. Thus the status or sample selection equations are equivalent to school attendance equations. Students were also excluded from the wage equations. But we do not have wage rates for all persons who were not students. Some non-students were also not employed. To correct the wage equation for sample selection bias we need to consider all persons without a recorded wage rate, whatever the reason.[15]

The variables used in the analysis are defined below.

Weeks Worked: Annual weeks worked, October to October.

Wage Rate: Earnings divided by hours worked, first full week in October.

Test Scores Total: Sum of scores on six tests - vocabulary, reading, mathematics, picture-number, letter groups, mosaic comparisons.

Class Rank in High School: Percentile ranking relative to other persons in individual's high school.

Job Training in High School: One if the individual received in high school "any specialized training intended to prepare you for immediate employment upon leaving school? (For example, auto mechanics, secretarial skills, or nurses aid)," zero otherwise.

Hours Worked during High School: Response to the question, "On the average over the school year, how many hours per week do you work in a paid or unpaid job? (Exclude vacation.)" The response was by interval: 0, 1-5, 6-10, ..., 26-30, over 30.

Parents' Income: Annual income of parents, in thousands.

Education of Mother (Father) less than High School: One if the youth's mother (father) had less than a high school education and zero otherwise.

Education of Mother (Father) College Degree or More: One if the youth's mother (father) had a college degree or more education, and zero otherwise. The excluded category is a high school degree but less than a college degree.

Race: One if non-white, zero otherwise.

Dependents: Number of persons dependent on the individual for income.

School Years: Number of Octobers in which the individual said he was in school.

On the Job Training: Months of on-the-job training.

Experience: Work experience, in years. Excludes work while attending a post-secondary school. Experience is distinguished by the year in which it occurred.

Part-Time Working: One if the individual is working part-time, zero otherwise.

Rural, Urban: One if the individual's residence location corresponds to the one indicated, zero otherwise. The excluded category is suburban and town.

West: One if the person lives in the West, zero otherwise.

State Wage: Annual average wage in manufacturing.

State Unemployment: Average annual unemployment rate.

Missing Variable Indicators: For test scores, class rank, parents' income, experience. Each is one if the designated variable is missing and zero otherwise. The corresponding variable takes the value zero if it is missing and the recorded value if it is not.

The means and standard deviations of these variables are given in Appendix Table C.

C. School Attendance

As a concomitant of the procedure used to estimate both the weeks worked and the wage equations we estimated school attendance equations, or more precisely, the probability of not attending school. Before presenting results on the central questions of our analysis, we will summarize briefly the implications of the estimated attendance probability parameters.

Non-school attendance equations estimated with the weeks worked equations are presented in Table 7B; those estimated with the wage equations are shown in Table 8B. The two sets of parameter estimates are necessarily very similar. The discussion in this section is based on those estimated with weeks worked. Recall that the parameter estimates in Table 7B are analogous to the parameters δ in equations (2) and (4). The variables used in the probability equations are easily identifiable by glancing at the table. They need no further explanation. The first two groups of variables pertain to school achievement and family background. All are measured with considerable precision, as shown in the table.

To get a better idea of the importance of the variables, however, we have calculated estimated differences in the probability of attending school for persons who have different values of a specified variable, but the same values for all the others. All other variables were assumed to have values equal to their respective means. The specified differences and the associated differences in estimated school attendance probabilities are shown in the tabulation below.

Difference in Academic or Social Background	Associated Differences in the Probability of School Attendance 1972-73	1973-74	1974-75	1975-76	1976[h]
Test scores one S.D. above the mean, versus one S.D. below	.242	.254	.247	.230	.181
Class rank oneS.D. above the mean, versus one S.D. below	.308	.279	.288	.292	.165
Parents income one S.D. above the mean, versus one S.D. below	.112	.104	.096	.104	.059
Education of Father & Mother college or more, versus less than h.s. graduate	.341	.247	.319	.323	.230
Non-white, versus white	.103	.097	.091	.109	.136

Possibly the most notable finding is that the probability that non-whites are in school, controlling for other variables, is considerably higher than for whites, at least .10 in each of the five years.[16] (Recall that the summary numbers in Table 1 show that in each of the first four years following high school, the percent of non-whites in school full-time was between 11 and 13 percentage points less than the percent for whites.) This could result from relatively fewer opportunities in the labor force. But as indicated in the wage equation estimates, discussed below, after controlling for other variables, there is little difference between the wage rates of whites and non-whites in the first three years; in the last two, non-whites are estimated to earn about 4 percent more than whites.[17] And the weeks worked equations indicate that after controlling for other variables non-whites work about the same number of weeks per year as whites. It could also reflect higher returns to education for non-whites than for whites, as discussed by Freeman [1976a, 1976b], for example.

---

[h] Based on the non-school attendance equation estimated with the 1976 wage equation. See Table 8B.

The other academic and family background variables are all related in the expected way to school attendance, although the relative magnitudes may not be widely known. Parents' income seems to have much less effect on school attendance than either of the measures of academic achievement. Parents' income may be the least important of all the variables listed. Class rank seems somewhat more important than the test scores, although our comparison is only suggestive. Recall that the tests measure a range of abilities and achievements, some more academically oriented than others. Also, we have made no attempt to distinguish types of school. The relative importance of academic ability is likely to increase with the quality of school.[18] Finally, there are large differences in expected probability of school attendance associated with extremes in parents' education.

In an alternative specification of the school attendance equations in Table 7B we also included the number of hours worked per week in high school--measured--as one of seven intervals, 1 to 5, 6 to 10, . . . , over 30--and a variable indicating whether or not the individual had job training during high school. It is questionable whether the job training variable (and possibly hours worked in high school) should be included in a school attendance equation. The question arises because job training in high school may indicate a "non-college trait" and thus a prior decision not to go to school--it may be more an indicator of post-secondary school attendance rather than a determinant of it. But because the relationship between these choices while in high school and later school attendance may be of interest we have reported the results when they are included. Their inclusion has a negligible effect on the other parameter estimates.[19]

Persons who work more than about twenty hours per week in high school are considerably less likely to be in school in any of the four years than those who work less, according to the estimates of the coefficients on hours worked in high school. The average effect on the probability of school attendance of working 21 to 25, 26 to 30, or more than 30 hours per week is about .10, with the probability evaluated at the means of the other variables. Persons who work less than twenty hours per week are also less likely to be in school during the first year after high school than those who don't work at all, but the relevant coefficients are not measured very precisely.[20] In the remaining three years, the estimates indicate little relationship between post-secondary school attendance and hours worked in high school until hours worked exceeds 20 hours per week approximately.

Recall that these are estimates after controlling for high school achievement and family background. We will show below that, with a few notable exceptions, the number of hours worked during high school is not strongly related to most measures of socioeconomic background nor to school achievement. It is largely an independent personal characteristic.

Recall that only for persons who work many hours per week during high school is such work significantly related to later school attendance. There is a tendency for persons who work a lot to be less inclined to continue their formal schooling. Possibly some have made a prior decision to work rather than go to school. We will see, however, that hours worked in high school are strongly related to weeks worked per year after graduation. As expected, persons who get job training in high school are considerably less likely to go to school later than those who don't.

Only two of the other variables in Table 8B need be mentioned; the others may be thought of simply as controls. One might suppose that school attendance would depend on expected wage if not in school and the ease of finding work; thus the state wage and unemployment variables have been included in the probability equations. They could be considered as rough instruments for individual wage and unemployment rates. Neither is significantly different from zero in most years, although the wage rate in each year is negatively related to school attendance and the unemployment rate positively related. The wage rate is significantly different from zero by standard criteria during the first two years. It could be that labor force opportunities are important determinants of school attendance right after high school, but that in the later years, once in school, persons don't drop out due to changes in the wage rate, and they are less likely to enter school having not attended previously. The marginal lifetime return to an additional year of school probably increases as one nears college graduation.

Finally, persons who go to rural high schools are less likely to be in school after graduation--the difference in probability is about .06 in the first two years and .12 and .13 respectively in the third and fourth years.

Table 7A. Estimates of Weeks Worked Equation Parameters, by Year

Variable	October 1972 to October 1973	October 1973 to October 1974	October 1974 to October 1975	October 1975 to October 1976
Hours Worked during High School:				
1 to 5	0.1700 (1.1629)	1.1246 (1.6710)	0.9006 (2.0376)	3.4239 (1.9529)
6 to 10	2.5027 (1.1893)	2.2663 (1.7883)	0.4056 (1.9750)	3.0490 (1.7620)
11 to 15	7.3619 (1.3896)	1.7668 (1.9820)	4.0527 (2.2907)	4.4541 (1.9907)
16 to 20	6.8180 (1.1109)	4.2688 (1.5694)	5.9215 (1.9135)	6.5548 (1.7884)
21 to 25	7.8500 (1.2329)	5.1503 (1.7854)	4.2531 (1.9096)	7.3057 (1.7893)
26 to 30	10.9685 (1.3189)	6.1313 (1.7165)	5.9604 (1.9496)	7.1673 (1.8737)
31 or more	12.5225 (1.1273)	7.6769 (1.5174)	8.9859 (1.8231)	8.1603 (1.6714)
Class Rank in High School	0.2323 (0.0267)	0.2120 (0.0276)	0.1914 (0.0294)	0.2044 (0.0270)
Test Score Total	12.1144 (1.4197)	10.8146 (1.6811)	9.7233 (1.7978)	6.7031 (1.6649)
Job Training during High School	-1.4376 (0.7151)	1.4486 (1.0539)	0.5983 (1.2593)	3.0389 (1.2358)
Race	-1.9184 (1.3714)	0.1898 (1.6311)	0.3935 (1.7363)	-0.9848 (1.5666)
Parents' Income	0.6370 (0.1168)	0.4868 (0.1211)	0.5015 (0.1401)	0.3137 (0.1218)
Dependents	4.2551 (0.5997)	1.6987 (0.7739)	1.3027 (0.7485)	1.8420 (0.6702)

(continued)

Table 7A. Estimates of Weeks Worked Equation Parameters, by Year. (completed)

Variable	October 1972 to October 1973	October 1973 to October 1974	October 1974 to October 1975	October 1975 to October 1976
On the Job Training Years		0.6600 (0.2667)	0.3335 (0.1885)	0.3680 (0.1653)
Rural	-2.5912 (0.9628)	0.1617 (1.3651)	-2.7939 (1.4721)	0.0897 (1.3027)
Urban	-1.4913 (0.8016)	-2.2115 (1.0583)	-1.2479 (1.2458)	0.3683 (1.1566)
State Wage	-2.1755 (0.9391)	-1.0422 (1.1206)	-1.9233 (1.0218)	-1.6065 (0.8324)
State Unemployment	-1.0645 (0.4069)	-0.4019 (1.1206)	-0.8878 (0.4418)	-0.7279 (0.2826)
Test Score Missing	33.0777 (4.3147)	29.6297 (5.1682)	26.4883 (5.5833)	19.3229 (5.1371)
Class Rank Missing	10.1779 (1.9191)	6.8823 (2.2285)	6.6354 (2.5529)	7.1726 (2.2480)
Parents' Income Missing	6.6426 (1.7567)	6.8539 (1.9804)	3.2212 (2.2199)	2.2059 (2.2028)
Constant	27.2947 (5.3019)	23.4604 (6.3969)	36.8182 (7.0262)	40.9972 (6.5931)

Table 7B. Estimates of Non-School Attendance Equation Parameters, by Year (Estimated with Weeks Worked Equation).[1]

	October 1972 to October 1973	October 1973 to October 1974	October 1974 to October 1975	October 1975 to October 1976
Test Scores Total	-0.7411 (0.0504)	-0.7704 (0.0684)	-0.7180 (0.0694)	-0.6714 (0.0674)
Class Rank in High School	-0.0154 (0.0008)	-0.0133 (0.0010)	-0.0132 (0.0010)	-0.0136 (0.0010)
Race	-0.2792 (0.0519)	-0.2509 (0.0687)	-0.2297 (0.0696)	-0.2726 (0.0678)
Parents' Income	-0.0284 (0.0039)	-0.0254 (0.0051)	-0.0228 (0.0051)	-0.0247 (0.0049)
Education of Mother Less than High School	0.1358 (0.0275)	0.0509 (0.0488)	-0.0067 (0.0511)	0.0372 (0.0511)
Education of Mother College Degree or More	-0.2534 (0.0449)	-0.1325 (0.0628)	-0.1540 (0.0703)	-0.1759 (0.0687)
Education of Father Less than High School	0.2503 (0.0277)	0.2808 (0.0466)	0.2560 (0.0494)	0.2295 (0.0504)
Education of Father College Degree or More	-0.2890 (0.0377)	-0.1772 (0.0554)	-0.3991 (0.0631)	-0.3675 (0.0607)
Rural	0.1708 (0.0341)	0.1542 (0.0529)	0.3022 (0.0551)	0.3186 (0.0554)
Urban	-0.0456 (0.0278)	-0.0174 (0.0439)	-0.0071 (0.0475)	-0.0387 (0.0470)
State Wage	0.1444 (0.0333)	0.0658 (0.0437)	0.0063 (0.0397)	-0.0030 (0.0339)
State Unemployment	-0.0191 (0.0141)	-0.0156 (0.0179)	-0.0195 (0.0167)	0.0008 (0.0112)
Test Score Missing	-2.1016 (0.1579)	-2.1982 (0.2177)	-2.115 (0.2237)	-2.0005 (0.2169)
Class Rank Missing	-0.5491 (0.0704)	-0.4709 (0.0941)	-0.5977 (0.0980)	-0.6305 (0.0940)
Parents' Income Missing	-0.2979 (0.0643)	-0.3408 (0.0845)	-0.2796 (0.0868)	-0.3026 (0.0836)

(continued)

Table 7B. Estimates of Non-School Attendance Equation Parameters, by Year (Estimated with Weeks Worked Equation).[1] (completed)

	October 1972 to October 1973	October 1973 to October 1974	October 1974 to October 1975	October 1975 to October 1976
Constant	2.5045 (0.1903)	2.7335 (0.2584)	3.0666 (0.2675)	3.0571 (0.2619)
Correlation with Weeks Worked Equation	-0.9276 (0.0381)	-0.9321 (0.0248)	-0.8680 (0.0461)	-0.8190 (0.0543)
Standard Error Weeks Worked Equation	24.5215 (0.7192)	23.3751 (0.6595)	25.1452 (0.8119)	24.0463 (0.7394)
Likelihood Value	-6243.7689	-6435.9659	-6598.4836	-7607.7185
Sample Size Total	4100	3885	3864	4100
Number with Weeks Worked	1406	1545	1811	2150

i. These equations pertain to the probability of not being in school in both the October beginning the year and the following October.

D. Weeks Worked

Estimates of the parameters in the weeks worked equations are shown in Table 7A. The most significant finding is that hours worked while in high school bear a substantial relationship to weeks worked per year in the years immediately following high school graduation. The estimated coefficients corresponding to hours worked intervals in high school are reproduced in the tabulation below. As can be seen in Table 7A, they are measured with considerable precision. Recall that they represent an upper bound on the effect of high school work. They are slightly larger than the estimated effect of high school hours worked on expected weeks worked, evaluated at $X\beta$ close to zero. As the expected value of Y rises, and thus the expected value of weeks worked, the marginal effect of hours worked in high school falls. Indeed, as the expected number of weeks worked approaches 52, the marginal effect of a change in any variable declines, and must ultimately approach zero.

To give an idea of the magnitude of the decline, we have evaluated the estimated effects of high school work at two additional points. One is the expected value of weeks worked evaluated at the mean of X for all persons in the sample, whether they were in fact in the labor force or in school. These values are shown in the second portion of the tabulation. In addition, the expected value of weeks worked is shown for each year, along with an "adjustment factor." The adjustment factor indicates the multiple by which the estimates in the first portion of the table must be multiplied to get the estimates in the second portion.[21]

The other evaluation point is the mean of X for persons who were in the labor force and conditional on knowing that they were. The estimated effect on weeks worked over the four year period is shown in the last column.

Hours Worked in High School	Estimated Effect on Weeks Worked				
	1973	1974	1975	1976	Total
Effect at Zero Weeks Worked (Estimate of β)					
1 to 5	0.17	1.12	0.90	3.42	5.61
6 to 10	2.50	2.27	0.41	3.05	8.23
11 to 15	7.36	1.77	4.05	4.45	17.63
16 to 20	6.82	4.27	5.92	6.55	23.56
21 to 25	7.85	5.15	4.25	7.31	24.56
26 to 30	10.97	6.13	5.96	7.17	30.23
over 30	12.52	7.68	8.99	8.16	37.35
Effect at Mean of X in Total Sample					
Expected Weeks	47.20	47.26	47.36	47.04	--
Adjustment Factor	0.270	0.287	0.270	0.297	--
1 to 5	0.06	0.32	0.24	1.02	1.64
6 to 10	0.68	0.65	0.11	0.91	2.35
11 to 15	1.99	0.51	1.09	1.32	4.91
16 to 20	1.84	1.22	1.60	1.95	6.61
21 to 25	2.12	1.48	1.15	2.17	6.92
26 to 30	2.96	1.76	1.61	2.13	8.46
over 30	3.38	2.20	2.43	2.42	10.43
Effect at Mean of X for Persons in Labor Force					
Expected Weeks	44.17	43.26	44.42	44.41	--
Adjustment Factor	0.484	0.567	0.461	0.458	--
1 to 5	0.08	0.64	0.41	1.57	2.70
6 to 10	1.21	1.29	0.19	1.40	4.09
11 to 15	3.56	1.00	1.87	2.04	8.47
16 to 20	3.30	2.42	2.73	3.00	11.45
21 to 25	3.80	2.92	1.96	3.35	12.03
26 to 30	5.31	3.48	2.75	3.28	14.82
over 30	6.06	4.35	4.14	3.74	18.29

Estimates of the β coefficients on hours worked range from zero for hours between 1 and 5 to over twelve for hours greater than 30. Even in the fourth year, the estimated values of β are very large, ranging from 3 for the fewest hours category to over 8 for the largest. It is notable, that after four years, the relationship of even a little work in high school to work after high school is substantial. Over the four year period, the sum of the estimates range continuously upward from 6 weeks to 37 weeks.

Expected weeks worked per year evaluated at the mean of the right-hand variables averaged over all persons in the sample is about 47 weeks in each of the four years. Even at this level, the estimated relationship to work in high school is very large. The average over the four years of the effect of working between 16 and 20 hours per week is about 1.5 weeks per year. For persons who worked over 30 hours, the average of the estimated effects is almost 3 weeks per year. The sums of the effects for the four years range from 2 to 11 weeks.

Possibly the most intuitively meaningful results pertain to persons who did in fact choose to work rather than go to school. Expected weeks worked evaluated at the mean of X over persons observed to be in the labor force is about 44 weeks in each of the four years. The sums of the effects over the four years range from almost 3 to close to 18 weeks. Sixteen to twenty hours of work in high school is associated with an average of almost 3 weeks per year in weeks worked during the four years after graduation.

Estimates of the marginal relationship between hours worked in high school and weeks worked, evaluated at any other expected value of weeks worked, can be obtained by multiplying the numbers in the top portion of the tabulation by the appropriate adjustment factor. For example, the appropriate multiple when the expected value of weeks worked [E(y)] is thirty is approximately .86 in each of the four years.[22]

How to interpret this finding is open to question. It is possible that persons who work in high school gain skills and other attributes, through their work, that give them an advantage in the labor market after graduation. Demand may be greater for them than for persons who do not work. This is consistent with the finding that wage rates are also higher for persons who work in high school, although the relationship is not nearly as strong as that between weeks worked and work in high school. But we might expect such an advantage to diminish over time, as post-high school experience becomes an increasingly larger proportion of total experience. And although the estimated effect declines somewhat, it is still very important four years after graduation. This suggests that working in high school may be an indication of personal characteristics not gained through work, but leading to work in high school as well as greater labor force participation following graduation. That is, it is not that the demand is greater for persons who work in high school, but that these persons have a greater propensity to work. That wage rates are not so greatly affected by high school work seems to add to the evidence for this interpretation.

Even this latter interpretation, however, would not rule out the possibility that work experience while in high school, for persons like those in our sample who did not work, would increase their employment after high school. Working may in fact enhance ih these persons attributes that were associated with high school work of persons in our sample. And, as we shall see below, work experience while in high school may increase subsequent wage rates in much the same way that work experience upon graduation increases later wage rates in the labor market.

It is informative to consider these findings and possible interpretations of them, in conjunction with the relationship between work in high school and other school and family characteristics. We shall return to that after some discussion of some of the other results shown in Table 7A.

Class rank in high school is strongly related to weeks worked in each of the four post-high school years. The estimates indicate that a 50 point increase in class rank is associated with an increase of about 10 in the expected value of Y, or say 3 in the expected value of weeks worked, over the total sample. This result is based on holding constant the test score. The test score appears to measure a combination of aptitude and achievement. No matter what the interpretation of test score, conditional on holding it constant, class rank is likely to reflect effort directed to doing well in high school. Effort in school, like the characteristic reflected in high school work, is related to later labor force participation at least for the next four years. Both hours worked and class rank may capture what is sometimes referred to as the "work ethic." Those who work harder in high school also work more in subsequent years. Or, those who become accustomed to working at a young age maintain the habit. Or, if they have or develop early in life characteristics associated with working, they maintain them.

We also find that high test scores are associated with more employment after graduation, but the effect diminishes over the four years following graduation. An increase of one standard deviation--about .4--in the sum of the test scores is associated with a 1½ week increase in expected weeks worked in the first year and declines continuously to about 1 week in the fourth. It may be that persons with greater ability or achievement, as reflected in the test scores have an advantage in the labor market, but as time goes on the skills that are associated with the test scores are in part compensated for by skills developed on the job or elsewhere. That their effect diminishes over time suggests that the reason is not entirely a permanent underlying individual characteristic. (The wage equation estimates suggest some advantage to higher test scores, but there is no distinct time pattern.)

We could find no measure of high school vocational or industrial training that was significantly related to employment, or wage rates, after graduation. The variable included in the results in Table 7A is high school training for a particular job. We assumed that if any high school training mattered, this training should. It doesn't. We experimented with many other measures of job related training -- semesters of various vocational courses, academic versus non-academic tracking, and others. We found none that was related to subsequent employment. It could be that the least able are directed to vocational training courses, or self-selected into them. But our results are conditional on controlling for traditional measures of school performance -- class rank and test scores.

This cannot be interpreted to mean that no training matters; but it does indicate strongly that none of the training in current high school curricula, or at least that systematically measured in the survey, is related to later labor force participation after high school. We were not able to distinguish vocational high schools from others. In subsequent work we will. It is possible that the effect of training in a vocational high school is different from the effect of training received in schools whose curricula are not primarily directed to job training.

Non-whites are employed about the same number of weeks per year as whites during the first years following high school graduation. The differences between the expected value of weeks worked for non-whites and whites, evaluated at the mean of X in the sample, are -.52, .05, .11, and -.29 respectively in the first four years following high school graduation. None is significantly different from zero by standard criteria. Remember that these results are partial effects after controlling for other variables, unlike the summary statistics in the first section of the paper. (The simple averages in Table 6 indicate fewer weeks worked by non-whites than whites during the first two years after high school, but little difference in the third and almost none in the last.) The wage estimates below indicate that after controlling for other variables, wage rates of whites and non-whites are quite close in the first three October periods and in the last two that non-whites earn about 4 percent more per hour than whites. And the averages in Table 5 indicate whites and non-whites who are not in school have very similar weekly earnings and hours worked, as well as wages.

Parents' income bears a substantial positive relationship to weeks worked during each of the first four years after graduation. In the first year, an increase in parental income of $5,000--about a standard deviation--is associated with an increase in weeks worked of over 3 weeks. The relevant coefficient declines over time to about half of its original size by the fourth year. If children whose parents have higher paying jobs have an advantage in finding work, the advantage apparently diminishes as the youth cohort gains labor market experience.

In sum, the most important determinants of weeks worked seemed to be characteristics associated with effort pursuant to succeeding in high school, as measured by class rank after controlling for ability, and to effort devoted to outside work while in high school, in particular the latter. It may be informative therefore to consider the relationship between hours of work while in high school and other personal and family characteristics.

For descriptive purposes, we have obtained coefficient estimates from a least squares regression of hours worked per week on several variables. The coefficients and standard errors pertaining to the variables

Variable	Coefficient	Standard Error
Test Score Total	-2.81	(0.92)
Race	-5.33	(0.87)
Parents' Income	0.22	(0.07)
Education of Mother Less than High School	0.49	(0.69)
Education of Mother College Degree or More	-0.85	(1.51)
Education of Father Less than High School	0.36	(0.68)
Education of Father College Degree or More	-1.58	(1.28)

Class Rank in High School	0.01	(0.01)
Job Training during High School	0.37	(0.66)
Extracurricular Participation in High School	0.51	(0.29)

of most interest are listed above.[23] There are two groups of variables: one that can be interpreted as composed of predetermined personal and family characteristics; the second group is composed of measures of the individuals' high school experience other than hours worked while in high school. There seems not to be a substantial tradeoff between any of these latter measures and hours worked. For example, working does not seem to take the place of studying, as reflected in class rank after controlling for test scores. Comparable results were found by Griliches [1977].

Race is the only variable that stands out. Non-whites work considerably less in high school than whites, given the measures of parents' income and education. This may result either from differences between the two groups in job opportunities, or from differences in work habits, or some combination of the two. Whatever the reason, 5 hours less work in high school is associated with a maximum of about 1.5 fewer weeks worked in the years following graduation, according to the weeks worked results. Recall that after controlling for hours worked in high school as well as other variables, non-whites work about the same number of weeks per year as whites.

In addition, persons with higher test scores work a bit less and those with higher parents' income a bit more. (The standard deviation of test scores is .4 and of parents' income is 5.7, in thousands.) The latter may result from more job possibilities if one's parents have better jobs, or it may reflect cultural differences related to income.

Possibly persons with higher test scores, given class rank, foresee a greater probability of going to college and thus are somewhat less inclined to take jobs in high school. This is consistent with the non-school attendance results.

Thus we have in hours worked in high school a personal characteristic that is somewhat related to race, test scores, and parents' income.[24] But after controlling for these variables hours worked in high school is strongly related to weeks worked after graduation. Hours worked captures an individual attribute that is not simply a reflection of other personal and family socioeconomic characteristics. It reflects a largely independent personal attribute that persists over time.

We shall mention briefly the effects of the remaining variables in Table 7B. The estimated effect of on-the-job training is always positive, but it declines over time. This result may be due to training agreements or employment expectations that lead to training for persons who expect to continue in the same job, or who employers expect to continue. The effect might be expected to die out over time as persons are increasingly likely to have changed jobs.

Persons living in urban areas are employed less than others. According to our imprecise estimates, the maximum negative effect is 2.2 weeks; in the last year when a larger proportion of those working are college graduates the estimated urban effect is in fact positive. although not significantly different from zero. College graduates may have relatively greater work opportunities in urban areas. As expected, state unemployment is negatively related to employment of youth. Roughly speaking, if the unemployment rate increases by a percentage point expected weeks worked by these youth falls by about half a week, about one percent of the mean value of weeks worked. The higher the state wage as we have measured it, the lower the number of weeks worked by youth.[25]

Finally, for each year our procedure estimates the correlation between the random term in the weeks worked equation and the random term in the probability of non-school attendance equation. They are reported for each year in the last section of Table 7B. Recall that a zero correlation coefficient indicates no sample selection bias. Our estimates (and standard errors) for the four consecutive years are -.93 (.03), -.93 (.02), -.87 (.05), and -.82 (.05). That is, in each year unmeasured determinants of college attendance bear a very strong positive relationship to unmeasured determinants of weeks worked. Holding constant the variables we have measured, persons who choose to go to school would work more if they were in the labor force than those who choose not to go to school after high school. The relationship is very striking. The results seem to indicate that the motivations or drives that characterize persons who continue their education are also attributes that are related to increased employment if not attending school. In practice, correction for sample selection, by estimating jointly weeks worked and the probability of non-school attendance, increases substantially the estimated coefficients on class rank, test scores, and parents' income, but yields coefficients on the other variables that are close to Tobit results. For purposes of comparison, weeks worked parameter estimates by method of estimation are presented in Appendix Table B.

We have not in this specification of weeks worked included a schooling variable. One might suppose, however, that if the probability of school attendance in a given year is positively related to the number of weeks a person would work if he were in the labor force, then also the number of years of schooling prior to a given year would be likely to affect weeks worked in that year if a person were in the labor force. When prior schooling is included in the weeks worked equations, however, its effect is not significantly different from zero, even with prior schooling also included in the sample selection equation. This suggests that the large correlation between unmeasured determinants of school attendance and measured determinants of weeks worked reflects the difference between persons who attend school for several years after high school graduation--possibly long enough to obtain a degree -and those who don't. Apparently persons who move in and out of school during the first four years after graduation are in this respect much like persons who don't attend school at all.

E. Wage Rates

The wage rate parameter estimates are reported in Table 8A. Some have been referred to already. Work experience in high school is positively related to post-high school wage rates, as well as to weeks worked. In general, during the last four periods, persons who worked in high school earned roughly 5 to 9 percent more per hour than those who didn't. Thus not only are additional hours of work in high school associated with additional weeks worked after graduation, but higher earnings per hour as well. But although there is an increasing relationship between the number of hours worked in high school and weeks worked later; given 5 or 10 hours per week, additional hours in high school are not associated with increments in wage rates until high school hours exceed 30 per week.[26] For these reasons, we have used only three high-school-work intervals instead of the seven used in the weeks worked equations.

To evaluate the relationship between hours worked in high school and annual earnings, we need to consider the association between high school work and both weeks worked and the wage rate. (We have not considered the possible effect on hours worked per week.) In addition, according to our specification the marginal effect of any variable on weeks worked depends on the number of weeks worked at which the marginal effect is evaluated. (See pages 29 and 46.) Consider, for example, persons in the labor force who otherwise -- if not for high school work experience -- would have worked 44 weeks per year. This is approximately the average number of weeks worked by persons who were in the labor force (see page 46). According to our estimates, those who worked between 16 and 20 hours in high school earned about 12 percent more than those who didn't work at all in high school. Persons who worked over 30 hours earned about 18 percent more. The effect could be much greater for persons who would otherwise work less. For example, consider persons who would work only 30 weeks per year. Those who worked 16 to 20 hours in high school would earn about 25 percent more than those who didn't work at all. Those who worked more than 30 hours, would earn about 35 percent more. These latter figures should be considered only as indicative because the estimates do not allow interactions among the variables and therefore imply substantial extrapolation based on estimated coefficients. Nonetheless, the relationship between earnings and work in high school is certainly large even for persons who are working most of the time and is probably much larger for persons who, based on other characteristics, would work much less.

As with weeks worked, it seems likely that at least part of the effect results from personal characteristics associated with or developed through high school work as distinct from later work. If higher wage rates were the result simply of the additional experience or associated acquired skills one would expect both to be dominated eventually by post-high school work experience, and the estimated effect to decline over time.[27] Note that the estimated coefficients on high school work do not simply reflect the fact that persons who work while in high school also are employed more upon graduation and thus have higher wage rates because of more cumulated post-high school experience. The measured effect of high school experience is in addition to work experience after high school, also included in the equations.

Test scores and class rank are also positively related to wage rates. The effect of class rank seems to diminish somewhat with time, but the test score coefficients follow no apparent pattern. A standard deviation increase in the test scores total is associated with an average of estimated wage rate increases over the five periods of about 3 percent. The corresponding class rank effect is about 2 or 3 percent. The total effect of a standard deviation increase in both would be something like 5 or 6 percent. Together these measures may be assumed to represent some combination of academic aptitude, academic achievement, and academic success. Controlling for test score, class rank may also reflect effort in school comparable to hours worked as a measure of effort outside of school, as discussed in the section above on weeks worked. Any one of these attributes would presumably increase productivity per unit of time.

While traditional measures of academic success are positively related to wage rates, as are attributes associated with actual work experience in high school, high school training which is presumably closely directed to the development of job skills is not. The estimated coefficients on job training during high school are not significantly different from zero. This suggests that time taken from academic courses and devoted to job training instead, has a negligible effect on future wage rates. If high school training contributes to the development of job-related skills, they are at least offset by the loss in traditional academic training related to job performance. It is also possible that persons who are relatively poor academic performers and would be relatively poor job performers are self-selected into job training courses in high school. But as mentioned above, our estimates are conditional on class rank and test scores, possibly the most common measures of high school performance.

One might suppose that the effect of high school training would be greater for persons who left school after high school graduation than for those who obtained further education. Vocational training, for example, may be more important in jobs filled by high school graduates than in those typically filled by college graduates. Our wage data for 1972 includes only high school graduates; for that year the coefficient on high school training is negative but not statistically different from zero. In subsequent years, the sample with observed wage rates includes high school graduates as well as those with more education. Thus for 1974 and 1976 we reestimated the equations for high school graduates only; the coefficients on high school training were positive for each of these years but not statistically different from zero by standard criteria.[28]

While non-whites worked about the same number of weeks as whites after controlling for other variables (Table 7A), the wage rates of non-whites are a bit higher than those of whites, according to our estimates. The coefficient on race is positive in each of the five periods and significantly different from zero by standard criteria in the last two periods. In the fourth and fifth time periods, non-whites are estimated to earn about 4 percent more per hour than whites. (The summary statistics in Tables 5 and 6 show that the average wage rates of non-whites were slightly lower than the white averages in all but the first period and non-whites worked somewhat fewer weeks per year than whites in each year, not controlling for other variables.)

Parents' income has a substantial effect on wage rates. An increase of ten thousand dollars in parents' income is associated with an increase in wage rates of 8 to 12 percent. It may be that children of wealthier parents have different skills, values, or ambitions than those from poorer families. And presumably, wealthier parents are able to find, or help to find, better paying jobs for their children. The preponderance of young persons say that their jobs were found through family contacts or through friends. The effect of this benefit as reflected in wage rates seems not to decline much over our five periods; the advantage is maintained for at least these first four years.[29] Recall that the positive relationship between parents' income and weeks worked declined over time.

Persons with dependents not only are employed more, but earn more per hour as well -- approximately 3 percent per dependent in each period. This may result from greater pressure to find higher paying jobs, as well as to work more. Persons without dependents may be more willing to accept lower wages, at least temporarily, possibly while looking for another job.

On-the-job training does not yield appreciably higher wage rates during the first year or two after high school. But after that, when training has presumably paid off in better jobs, the effect shows up. By the fifth time period, the return to a year of on-the-job training is estimated to be 7.2 percent.[30] In the second, third, and fourth periods the estimated returns are 1.4, 2.5, and 6.1 percent respectively.

While the estimated effect of on-the-job training increases over time, our estimates suggest a decline over time in the return to years of post-secondary schooling. The estimates shown were obtained using nominal years of schooling.[31] As explained in Section II, these estimates should be expected to be biased. Indeed the positive relationship between the unobserved determinants of wage rates and school attendance, together with the positive correlation among the wage disturbance (discussed in the next section), imply that the estimates are biased upward.[32] In the second, third, fourth, and fifth time periods -- one, two, three and four years after high school graduation -- the schooling coefficients imply returns of 7.4, 5.5, 4.3 and 1.7 percent respectively. The results for the last period may be somewhat confounded because college graduates just entering the labor force are included in the sample. College graduates are likely to be in jobs with wage structures substantially different from persons without college degrees. There may not have been enough time for a college degree to pay off in terms of progression up the hierarchy associated with higher level jobs.[33] In addition, the result may reflect declines in the return to college education.[34]

The estimated returns to experience are substantially greater than to schooling during these first years following high school graduation.[35] Unlike the effect of hours worked in high school, the effect of early experience on later wage rates declines according to this specification. For example, a year of experience during the first year after graduation is associated with a 13 percent increase in wage rates in the second time period (the second October after graduation). The effect declines to 10 percent by the third, 6 percent by the fourth and 4 percent by the fifth period. In general, the effect on wage rates of recent experience is greater than the effect of earlier experience. Relative to the second, third, and fourth time periods -- for which experience is relevant -- the estimated effect of previous experience in the last time period is quite low, 4 percent for experience during the first two years and 5 or 6 percent for experience in the third and fourth years. Lest this pattern of results be taken too literally, we hasten to add two qualifications. The first is that the relative effect of experience across the time periods is dependent in part on changes in aggregate market conditions over the time period. Experience during the recession years is likely to have contributed less to earnings than experience in more expansive years. These results are of course determined in part by changes in aggregate market conditions over the 1972 to 1976 time period.[36]

Second, the specification as shown distinguishes experience by calendar year, but not by the number of years since leaving school. Thus, for example, experience in the "second year" may represent experience during the second year in the labor force for some persons, but during the first year in the labor force for others -- those who went to school for one year after high school and then entered the labor force. We tried two other formulations to check the sensitivity of the results to changes in specification. For 1974 we distinguished a separate experience variable for each possible schooling-labor force sequence. Thus for persons who didn't go to school after high school we allowed one experience variable for the first year in the labor force and another for experience in the second; these estimates (and standard errors) were .062 (.051) and .071 (.059) respectively. For persons who went to school the first year and entered the labor force the second, the coefficient on this first year of experience was .034 (.037). For those who were in the labor force the first year but went to school the second, the coefficient on the first year of experience was .042 (.059).

As mentioned above, for 1974 and 1976 we also estimated wage equations for persons with no post-secondary education. (Of course, persons in the sample in 1972, had no education past high school.) For this group, the estimated experience coefficients for 1974 were .116 (.057) and .134 (.074) respectively, as compared with .100 (.032) and .074 (.035) in Table 8 A. For 1976, the coefficients were measured very imprecisely but tended to be somewhat larger than those shown in the table. Thus it seems clear that early experience affects later wage rates. The precise patterns of the effects shifts with the sample and the specification although the differences are not statistically significant. Finally, we noted above that vocational training in high school was not significantly different from zero, even for persons with no post-secondary education. These estimates for 1974 and 1976 do reveal, however, that work experience in high school has a somewhat greater effect on wage rates for persons who got no further education than for the group as a whole.

The effect of experience as well as other variables is reflected of course in the small difference between the average wage rates of whites and non-whites shown in Table 5. For example, the average wage rate for whites is about 6 percent higher than for non-whites in 1976. Our estimated coefficient on race for 1976 implies that non-whites earn about 4 percent more than whites after controlling for other variables. But non-whites work fewer weeks than whites in each year, as shown in Table 6. Using these differences, the effect of fewer weeks worked per year on non-white wages would be about 1.3 percent in 1976, according to the estimated coefficients on experience in that year.

We also find that while part-time workers do not receive lower wages than full-time workers immediately after graduation, they do a few years later. By 1976, part-time workers were earning 15 percent less per hour than those working full-time. It is likely that part-time jobs are less likely to be characterized by ladder movement and associated wage increases than full-time ones. This may not affect initial wage rates much, but would after some time when many full-time workers would have moved up the ladder.

We experimented with several regional and residential location variables. Only a rural indicator and an indicator for the western region are included in the specification shown. After controlling for an average state wage measure, none of the other controls for aggregate market conditions affected youth wages.

We will not comment on the "non-school attendance" estimates in Table 8B. They are essentially comparable to those in Table 7B, that were discussed above.

At the bottom of Table 8B, however, are shown the estimates of the correlations between the wage rate and non-school attendance disturbances. As in the weeks worked results, we find a positive correlation between unmeasured determinants of school attendance and the disturbances in the wage rate equations, although the relevant correlations are much smaller. Thus, according to our results, persons who go to school if they were working would earn more than those who in fact elect to work, even if the two groups of individuals had the same measured characteristics. The estimated correlation is .21 in 1972 and then rises to .36 in 1973. After that, they decline rather evenly to .19 in 1976. It is reasonable to expect them to decline as more and more persons enter the labor force after having been in school for one or more years.

Table 8A. Estimates of Wage Equation Parameters by Year.[j]

Variable	October 1972	October 1973	October 1974	October 1975	October 1976
Hours Worked during High School:					
to 15	0.0446 (0.0297)	0.0593 (0.0294)	0.0627 (0.0255)	0.0446 (0.0274)	0.0610 (0.0238)
16 to 30	-0.0127 (0.0284)	0.0407 (0.0252)	0.0209 (0.0244)	0.0637 (0.0250)	0.0411 (0.0209)
31 or more	0.0202 (0.0342)	0.0971 (0.0293)	0.0541 (0.0284)	0.0876 (0.0287)	0.0904 (0.0251)
Class Rank in High School	0.0011 (0.0009)	0.0013 (0.0006)	0.0009 (0.0006)	0.0007 (0.0006)	0.0008 (0.0004)
Test Score Total	0.0294 (0.0358)	0.1002 (0.0351)	0.0363 (0.0300)	0.0529 (0.0325)	0.0996 (0.0271)
Job Training during High School	-0.0272 (0.0297)	-0.0481 (0.0266)	-0.0152 (0.0257)	-0.0221 (0.0236)	0.0196 (0.0215)
Race	0.0164 (0.0322)	0.0160 (0.0287)	0.0078 (0.0256)	0.0479 (0.0297)	0.0431 (0.0272)
Parents' Income	0.0095 (0.0026)	0.0077 (0.0022)	0.0113 (0.0021)	0.0101 (0.0021)	0.0083 (0.0019)
Dependents	0.0221 (0.0143)	0.0306 (0.0131)	0.0336 (0.0109)	0.0318 (0.0120)	0.0326 (0.0091)
On the Job Training Months	--	0.0012 (0.0041)	0.0021 (0.0023)	0.0041 (0.0026)	0.0060 (0.0022)
School Years	--	0.0735 (0.0429)	0.0547 (0.0247)	0.0433 (0.0202)	0.0166 (0.0082)
Experience:					
First Year (1972-73)	--	0.1266 (0.0471)	0.0997 (0.0323)	0.0540 (0.0307)	0.0385 (0.0219)
Second Year (1973-74)	--	--	0.0741 (0.0345)	0.1055 (0.0330)	0.0275 (0.0231)
Third Year (1974-75)	--	--	--	0.1168 (0.0289)	0.0602 (0.0239)
Fourth Year (1975-76)	--	--	--	--	0.0513 (0.0247)

(continued)

Table 8B. Estimates of Non-School Attendance Equation Parameters, by Year (Estimated with Wage Equations).

Variable	October 1972	October 1973	October 1974	October 1975	October 1976
Test Scores Total	-0.4809 (0.0697)	-0.5913 (0.0757)	-0.6648 (0.0774)	-0.5853 (0.0790)	-0.5618 (0.0818)
Class Rank in High School	-0.0160 (0.0011)	-0.0145 (0.0011)	-0.0136 (0.0011)	-0.0134 (0.0011)	-0.0083 (0.0011)
Race	-0.3242 (0.0705)	-0.2732 (0.0765)	-0.2534 (0.0797)	-0.3473 (0.0814)	-0.3863 (0.0831)
Parents' Income	-0.0209 (0.0054)	-0.0201 (0.0057)	-0.0151 (0.0056)	-0.0201 (0.0057)	-0.0153 (0.0058)
Education of Mother Less than High School	0.1406 (0.0563)	0.2221 (0.0619)	-0.0123 (0.0641)	-0.0087 (0.0653)	-0.0019 (0.0690)
Education of Mother College Degree or More	-0.2725 (0.0911)	-0.0607 (0.0812)	-0.1357 (0.0840)	-0.2226 (0.0835)	-0.1247 (0.0808)
Education of Father Less than High School	0.2712 (0.0549)	0.2179 (0.0588)	0.2848 (0.0621)	0.3237 (0.0640)	0.1985 (0.0670)
Education of Father College Degree or More	-0.2385 (0.0778)	-0.2521 (0.0735)	-0.3495 (0.0742)	-0.3798 (0.0742)	-0.3068 (0.0702)
Hours Worked during High School	0.1184 (0.0199)	0.0998 (0.0209)	0.1147 (0.0214)	0.0786 (0.0220)	0.0710 (0.0219)
Job Training during High School	0.4921 (0.0576)	0.5072 (0.0655)	0.4238 (0.0708)	0.3498 (0.0721)	0.1924 (0.0748)
Rural	0.1195 (0.0597)	0.1157 (0.0632)	0.3155 (0.0646)	0.2781 (0.0676)	0.3078 (0.0692)
Urban	-0.0605 (0.0551)	-0.0747 (0.0570)	0.0450 (0.0576)	0.0520 (0.0580)	-0.0817 (0.0582)
State Wage	0.1520 (0.0443)	0.0815 (0.0447)	0.0288 (0.0424)	-0.0311 (0.0388)	0.0029 (0.0352)

(continued)

Table 8A. Estimates of Wage Equation Parameters by Year.[j] (completed)

Variable	October 1972	October 1973	October 1974	October 1975	October 1976
Part-time Working	-0.0141 (0.0242)	0.0762 (0.0280)	-0.0961 (0.0344)	0.0045 (0.0317)	-0.1456 (0.0305)
Rural	0.0101 (0.0238)	-0.0287 (0.0208)	-0.0542 (0.0210)	-0.0029 (0.0220)	-0.0514 (0.0193)
West	-0.0153 (0.0242)	-0.0301 (0.0237)	-0.0014 (0.0218)	0.0950 (0.0234)	0.0814 (0.0213)
State Wage	0.0582 (0.0209)	0.1218 (0.0174)	0.0885 (0.0147)	0.0855 (0.0145)	0.0775 (0.0111)
Test Score Missing	0.0713 (0.1072)	0.2851 (0.1032)	0.1144 (0.0887)	0.2148 (0.1003)	0.3366 (0.0856)
Class Rank Missing	0.0106 (0.0438)	0.0215 (0.0378)	0.0181 (0.0383)	0.0053 (0.0388)	0.0361 (0.0326)
Parents' Income Missing	0.0896 (0.0399)	0.0720 (0.0364)	0.0891 (0.0331)	0.1192 (0.0368)	0.0786 (0.0305)
Experience Missing	--	0.0549 (0.0484)	0.0408 (0.0335)	0.0786 (0.0277)	0.0275 (0.0204)
Constant	0.5374 (0.1108)	0.1421 (0.1165)	0.5558 (0.1115)	0.4187 (0.1288)	0.4897 (0.0981)

[j] The data pertain to the first full week in October of each year.

Table 8B. Estimates of Non-School Attendance Equation Parameters, by Year (Estimated with Wage Equations). (completed)

Variable	October 1972	October 1973	October 1974	October 1975	October 1976
Test Score Missing	-1.3909 (0.2196)	-1.7156 (0.2393)	-1.9021 (0.2499)	-1.7546 (0.2542)	-1.7570 (0.2666)
Class Rank Missing	-0.6499 (0.0960)	-0.4990 (0.1041)	-0.5336 (0.1043)	-0.5836 (0.1094)	-0.3744 (0.1133)
Parents' Income Missing	-0.2448 (0.0891)	-0.2928 (0.0944)	-0.2539 (0.0972)	-0.3713 (0.1021)	-0.2019 (0.1026)
Constant	1.1362 (0.2678)	1.9271 (0.2945)	2.4743 (0.3024)	2.7925 (0.3086)	2.6646 (0.3146)
Correlation with Wage Equation	-0.2115 (0.1633)	-0.3610 (0.1414)	-0.3557 (0.1233)	-0.1932 (0.1416)	-0.1937 (0.1641)
Variance of Wage Error	0.3542 (0.0100)	0.3496 (0.0127)	0.3509 (0.0102)	0.3649 (0.0076)	0.3482 (0.0070)
Likelihood Value	-2538.7109	-2321.7729	-2354.3789	-2441.3557	-2444.0023
Sample Size Total	4000	3400	3300	3200	3100
Number with Wage	1402	1489	1659	1728	2070

III. The Persistence of Early Labor Force Experience

Early labor force experience may be related to later experience for at least four reasons: (1) Measured attributes of individuals are similar from period to period. For example, we have found that persons from wealthy families earn more per hour than those from poor families. And that persons with higher academic aptitude or measured achievement command higher wage rates than those with lower scores. (2) Some unmeasured attributes of individuals persist over time and are related to labor force experience. This reason is often referred to as heterogeneity. How much youth are helped by their families, for example, or difficult to define characteristics like motivation may fall into this category. (3) Random factors that affect labor force experience, although not constant over time, may be related from one time period to the next. The fortunes or misfortunes of a large firm in a small town may be an example. (4) Finally, labor force experience due to random occurrences or shifts in exogenous variables in one period may affect outcomes in later periods. This possibility is often referred to as state dependence.[37]

The first we have analyzed in Section II. The last three are the subject of this section, although we will not be able to distinguish each of them from all of the others. Our analysis will concentrate on inferences that can be drawn from relationships among the disturbance terms in the wage equations, and from relationships among nominal weeks worked as well as disturbances from the weeks worked equations. Because we have estimated weeks worked and wage equations separately for each year, and because we have obtained wage equation estimates allowing for

Although subsequent analysis will use estimated covariance terms, it is informative to look first at estimates of the correlations between the disturbances in the wage equations.[40] They are reproduced below, together with a correlation matrix of the logarithm of nominal wages.[41]

Correlation Matrix of Disturbances in the Wage Equations

October 72	1				
October 73	.538	1			
October 74	.304	.505	1		
October 75	.287	.373	.569	1	
October 76	.282	.412	.519	.727	1

Correlation Matrix of the Logarithm of Nominal Wages

October 72	1				
October 73	.563	1			
October 74	.342	.544	1		
October 75	.323	.411	.590	1	
October 76	.329	.458	.558	.752	1

The pattern of correlations suggests that unmeasured influences on wage rates are to a large degree temporary ones that do not persist from early to later years. The correlation between the first and the fifth wage disturbances is only .282. The correlations also suggest increasing consistency over time. For example, the correlation between the first and second disturbance is .538; but .727 between the fourth and the fifth. The correlations drop rapidly with increases in the time interval between periods. This can be seen by a glance at the last row of sample selection and weeks worked equations allowing for both sample selection and a limit of 52 weeks, it is cumbersome to estimate unconditional correlations among the population disturbances -- as specified in equations (1) and (5), for example. It is not straightforward to use the residuals because the independent variable is observed only for persons not in school and in the case of weeks worked because the independent variable is limited. For simplicity we will limit our discussion to the relationships over time, conditional on being in the labor force. This allows a rather straightforward variance components description of the structure of the correlations among the wage disturbances. We will consider them first. In addition to the variance components decomposition, we have used another method to describe the relationships among weeks worked over time, we will consider them second.[38]

For the wage rate disturbances we will be able to distinguish persistence over time due to heterogeneity from that caused by the last two reasons listed above. But we will not formally be able to distinguish the third from the fourth; that is, serial correlation from state dependence as they are interpreted here. What will show up as serial correlation in our analysis could result from what we would like to distinguish as state dependence. But we will be able to say something about the possible magnitude of a state dependence effect. Because our analysis relies primarily on inferences based on the estimated correlations (or covariances) among the disturbances, we will not give much attention to the subsequent effects of changes in labor force experience due to shifts in exogenous variables in earlier periods (included under our fourth reason).[39]

the correlation matrix, where the correlations between the last year's disturbance and those for prior years are recorded. Whatever the cause of the observed persistence, it declines rapidly over time to a floor of about .3 (that we will see in a moment can be attributed to persistent individual specific characteristics.) A casual comparison of the correlations suggests that the effect of individual specific characteristics on wage rates is dominated by random components that are serially correlated. We shall be more precise about that.

Suppose that the wage equation disturbances can be decomposed into individual specific and random terms. Let each disturbance be written as

$$\varepsilon_{ti} = u_i + e_{ti} ,$$

where u is an individual specific term, presumed to persist over the period of our data, and e is a random term. Suppose that the variance of u over individuals is σ_u^2 and the variance of e, allowed to differ from period to period, is given by σ_t^2. Also, assume that the terms e_{ti} follow a first order auto regressive process. Then the variances among the disturbances can be written as:

$$\sigma_{11} = \sigma_u^2 + \sigma_1^2$$

$$\sigma_{12} = \sigma_u^2 + \rho\sigma_1^2$$

$$\sigma_{13} = \sigma_u^2 + \rho^2\sigma_1^2$$

$$\sigma_{14} = \sigma_u^2 + \rho^3\sigma_1^2$$

$$\sigma_{22} = \sigma_u^2 + \sigma_2^2$$

$$\sigma_{23} = \sigma_u^2 + \rho\sigma_2^2$$

$$\sigma_{24} = \sigma_u^2 + \rho^2\sigma_2^2$$

$$\sigma_{33} = \sigma_u^2 + \sigma_3^2$$

$$\sigma_{34} = \sigma_u^2 + \rho\sigma_3^2$$

$$\sigma_{44} = \sigma_u^2 + \sigma_4^2$$

We have estimates of the σ_{ij}, based on residuals from the equations estimated above. Using a maximum likelihood procedure, we fitted these estimates to the specification just described. That is, we estimated σ_u^2, ρ, σ_1^2, ..., σ_4^2.[42] There are several special cases of this more general model. We shall mention two. One is obtained by supposing that the random components are not serially correlated, so that ρ is zero. (This would of course rule out state dependence.) In this case, all the covariances would be equal. The corresponding correlations would be the same, except to the extent that the variances of the random terms differ. The second constrains σ_u^2 to be zero; it rules out heterogeneity. Then the correlations between disturbances one period apart are given by $\rho\sqrt{\sigma^2_t} \,/\, \sqrt{\sigma^2_{t+1}}$, and for two periods apart by $\rho^2\sqrt{\sigma^2_t} \,/\, \sqrt{\sigma^2_{t+2}}$, etc... If the random term variances are equal, the correlations become ρ, ρ^2, etc...

Estimates of the components of variance for the wage disturbances, based on the unconstrained model, are recorded below.

Components of Variance Estimates and Standard Errors for the Wage Rate Covariance Structure[k]

Individual specific variance, σ_u^2	0.032	(0.009)
Random variance, period 1, σ_1^2	0.089	(0.013)
Random variance, period 2, σ_2^2	0.086	(0.008)
Random variance, period 3, σ_3^2	0.093	(0.013)
Random variance, period 4, σ_4^2	0.107	(0.012)
Random variance, period 5, σ_5^2	0.090	(0.013)
Serial correlation coefficient, ρ	0.454	(0.082)

We have also estimated a components of variance specification of the wage disturbances with the random component variances constrained to be equal. The results are as follows:

Constrained Components of Variance Estimates and Standard Errors for the Wage Rate Covariance Structure

Individual specific variance	0.034	(0.009)
Random variance	0.091	(0.009)
Serial correlation coefficient, ρ	0.430	(0.090)

---

[k] These are asymptotic standard errors based on the maximum likelihood estimation procedure and the associated information matrix. They should be considered only as illustrative. A more efficient, and consistent, procedure would take account of the variance-covariance matrix of the initial covariance matrix estimates. Such a procedure is described in Hausman and Wise [1978]. Because our original sample is so large, we suspect that the marginal gains from using this procedure would not be great.

They suggest the same general conclusions as those based on the unconstrained model, although we reject the hypothesis of equal variances. It is clear that both individual specific and random terms are important determinants of variance. These estimates suggest that between 23 and 27 percent of the error variances can be ascribed to individual specific characteristics that persist over the five time periods. The bulk of the variance, however, remains in the additive random terms. Those random terms are correlated over time. The estimated serial correlation coefficient in the unconstrained model is .454. We conclude that whatever the cause of this correlation over time, its effect is not lasting. The estimated effect of serial correlation on the aggregate correlations in the matrix above declines rapidly. Ignoring differences in random term variances, without the individual specific terms the estimated correlations between the disturbances one, two, three, and four periods apart would be .454, .206, .094, and .042 respectively.[43]

Thus we conclude that whatever causal effect there may be of early wage rate experience on later wage rates, it does not last very long; it is essentially absent after four or five years.

The correlations among the weeks worked disturbances for persons not in school are shown in the first tabulation below. The correlations among nominal weeks worked are shown in the second.[44]

Correlation Matrix of Weeks Worked Disturbances

October 72 to October 73	1			
October 73 to October 74	.351	1		
October 74 to October 75	.240	.333	1	
October 75 to October 76	.170	.270	.640	1

ble state dependence effect -- it is not lasting. These results based on weeks worked residuals are similar to those obtained for wage disturbances.

But in this case, the disturbances, like nominal weeks worked, are limited by the upper bound on total weeks worked. In practice, the estimated correlations are not affected much by the truncation of weeks worked. Correlation matrices of nominal weeks worked, and of weeks worked disturbances, based only on observations with weeks worked less than 52 are very close to those presented above. Nonetheless we found it more informative to describe relationships among weeks worked through a series of transition matrices, than to describe the relationship by an estimated components of variance structure. Our procedure was the following.

For each year we classified weeks worked into four intervals: 0 to 20, 21 to 40, 41 to 51, and 52. For each pair of years we calculated the transition probabilities of moving from an interval in the earlier year to each of the intervals in the second year. They are presented in Table 9, with the entries shown as percents. For example, the matrix headed "1974-75" in the middle of the table says that 71 percent of the persons who worked 52 weeks in 1974 also worked 52 weeks in 1975; 4 percent worked between 0 and 20 weeks. The numbers below and to the left of each matrix are marginal proportions (percents). All entries have been rounded to the nearest percent.

The table can also be used to calculate for each pair of years

Correlation Matrix of Weeks Worked

October 72 to October 73	1		
October 73 to October 74	.394	1	
October 74 to October 75	.285	.373	1
October 75 to October 76	.196	.302	.655

For comparison with the results for the wage disturbances, we fit the same variance components specification to the weeks worked residual covariance structure. The results are as follows:

Components of Variance Estimates and Standard Errors for the Weeks Worked Covariance Structure

Individual specific variance, σ_u^2	26.19	(19.14)
Random variance, period 1, σ_1^2	130.52	(26.76)
Random variance, period 2, σ_2^2	125.52	(16.84)
Random variance, period 3, σ_3^2	139.74	(25.60)
Random variance, period 4, σ_4^2	128.04	(26.48)
Serial correlation coefficient, ρ	.343	(.133)

The estimates are quite similar to those pertaining to the wage disturbances, although the proportion of variance due to individual specific terms is smaller -- between 16 and 18 percent, depending on the year. As with the wage disturbances, without individual specific terms, the correlations among the errors would be quite small. Ignoring differences in random term variances, the implied correlations one, two, and three periods apart are .343, .118, and .040 respectively. Thus, whatever the reasons for the correlation over time -- including a possi-

Table 9. Transition Probabilities (Percent) by Weeks Worked Interval, for Each Two-Year Combination, 1974-1976.

1973-74

9	30	24	23	24
20	11	35	33	21
31	2	12	42	43
40	4	8	26	62
	7	16	32	45

N = 1045

1973-75

8	27	27	16	30
20	9	25	25	41
31	6	12	29	53
41	6	8	19	66
	8	14	23	54

N = 868

1974-75

7	31	27	15	27
18	15	29	21	35
32	6	14	34	46
44	4	8	18	71
	8	15	23	54

N = 1164

Weeks Worked Interval
0 to 20
21 to 40
41 to 51
52

1973-76

8	13	26	20	41
19	13	24	23	40
32	4	15	29	53
42	5	8	22	65
	7	15	24	54

N = 892

1974-76

7	24	24	20	32
17	14	25	22	39
32	5	15	35	46
44	4	8	20	68
	7	14	25	53

N = 1093

1975-76

8	50	33	9	8
15	12	40	22	26
25	3	13	61	23
53	1	5	11	83
	7	14	24	54

N = 1581

the joint probability of each of the interval combinations. For example, the matrix headed "1973-76" in the lower left of the table says that 1 percent of the 892 persons who were not in school in both 1973 and 1976 worked less than 20 weeks in each of those years (13 percent of 8 percent).

Recall that some persistence over time is due to measured attributes of individuals that are similar from one period to the next. The slightly higher correlations among annual weeks worked than among the weeks worked residuals reflects the effect of these variables. It can be seen from the matrices above, however, that this difference is small. Only a small proportion of the variance in weeks worked is explained by measured individual attributes. The transition matrices in Table 9 present a blowup of the information contained in the nominal weeks worked correlation matrix. Thus persistence is somewhat higher than that due to unobserved components alone, but not much.

The transition matrices reveal several phenomena. The upper bound on weeks worked is reflected in the large probabilities of remaining in the 52-week "interval" from one period to the next, much larger than for any other interval. This is apparently because many persons who work 52 weeks are indeed constrained by this limit. Any who "would work" 52 weeks or more are observed to remain at the limit. Even persons observed to work 52 weeks in one year may still be at 52 weeks in the second even if their "unobserved propensity" to work declined between the two time periods. From the diagonal matrices it can be seen that those who remain at the limit for consecutive years increase from 62 percent between the first and the second to 83 percent between the third and the fourth.

Persistence in general increases over time, as can be seen from a comparison of the diagonal elements of the three diagonal matrices. For example, 30 percent of persons who are in the lowest interval in the first year are also in that interval in the second. But 50 percent who are in this interval in the third year are also there in the fourth. Apparently individual patterns become increasingly established.[45]

While experience in the fourth year seems strongly related to that in the third, the relationship between experience in the last year and earlier years declines rapidly with increasingly distant time periods. This pattern can be seen best by looking at the last row of matrices in in 1976. Of persons in the four intervals in 1975; 50, 12, 3, and 1 percent respectively are in the lowest interval in 1976. Of persons in the four intervals in 1973, the corresponding percents are 13, 13, 4, and 5. Whereas the likelihood that a person who was in the lowest interval in 1975 was also there in 1976 was 50 times as high as if he worked 52 weeks in 1975; if he were in the lowest interval in 1973, the likelihood of being in the lowest interval in 1976 was only about 2.5 times as high as if he had worked 52 weeks in 1973. These numbers are consistent with the simple correlations among weeks worked.

The numbers of persons who remain in the lowest intervals also can be inferred directly from Table 9. For example, 1 percent of persons who were not in school in both the first and the last year worked 20 weeks or less in each of the years.

We conclude, as with wage rates, that whatever the determinants of weeks worked, they do not for the most part persist over these four years. Recall that a small part of the relationship seen in the transition matrices is due to measured individual attributes. They are not distinguished in the matrices from unmeasured individual attributes, individual specific terms, commonly referred to as representing heterogeneity. Both measured and unmeasured individual specific characteristics produce some persistence over time. (The proportion of the residual variance due to individual specific terms, implied by the "residual" covariance matrix, was presented above.) The remainder of the relationship over time may be due to a true state dependence effect or to serial correlation induced by correlation over time of other factors that affect weeks worked. Whatever the reason, however, there seems to be very little room for a state dependence effect of labor force experience in the first year on experience in the last. Any effect there may be dies out rapidly.

As youngsters age their patterns of labor force experience become increasingly stable, as we might expect to find among persons moving from full-time school to full-time work, a process that is likely to involve considerable searching, job changing, and the like before settling into more or less permanent employment.[46]

Unmeasured determinants of wage rates in the early periods show little relationship to unmeasured determinants in later years. Unmeasured determinants of weeks worked in the earliest period show little relationship to those in the last. There is, however, a dependence between the two. As shown in Table 8A, experience in earlier years does affect wage rates in later years.[47]

IV. Summary and Conclusion

We have used the National Longitudinal Study of 1972 High School Seniors to analyze the relationship between high school preparation and other personal characteristics on the one hand and early labor force experience on the other.

In general, the data do not suggest to us severe employment problems for this sample of high school graduates. There are very few persons who are chronically out of school and unemployed. Estimated unemployment rates are moderate and employment ratios high. The implications that we draw from these data are at variance with those based on the Current Population Survey data, that suggest substantially higher unemployment rates for high school graduates and considerably lower employment ratios.

Average wage rates of employed whites and non-whites who are not in school are very similar. Wage equation estimates reveal that after controlling for other variables, non-whites earn slightly more per hour than whites. But average weeks worked per year are less for non-whites than whites although annual weeks worked equations that control for other variables indicate that non-whites are employed about as many weeks per year as whites with similar characteristics. At the same time, non-whites are more likely than whites to be in school; controlling for other variables, the probability of being in school is at least .10 higher for non-whites in each of five periods covering four post-high school years.

Although traditional measures of academic success -- standardized test scores and class rank -- are related to employment and wage rates following high school, measures of vocational and industrial training are not. Training presumably directed toward job related tasks does not enhance post-high school labor force experience, but attributes associated with traditional measures of academic success do.

Hours of work while in high school are very strongly related to weeks worked in particular and also to wage rates in each of the four years following graduation. An additional five hours of work per week in high school, at least up to 20, is associated with as much as 1.5 more weeks worked per year in each of the four post-high school years. The evidence suggests that this is due to individual attributes associated with working while in high school; these attributes may or may not be developed by this experience. Together with the effect on the hourly wage rate, the effect on earnings is quite substantial. This suggests to us that training only, without the attributes associated with work effort and or doing well in school, will not increase one's chances in the labor force. On the other hand, on-the-job training after high school is associated with higher wage rates. Possibly none of these findings should be especially surprising. They reinforce the oft-mentioned claim that ill-defined attributes associated with working hard and "doing well", maybe the work ethic, are important determinants of labor force "success". This idea seems to come through strongly in our statistical results.

The results should not be interpreted to mean that vocational training will not help persons do jobs better. It seems to us more likely that the kinds of training in current high school curricula does not. On-the-job training, for example, does have a significant effect on later wage rates. This is of course training combined with work. We were unable to distinguish training in vocational high schools from training in other high schools. Vocational high schools may provide better training and attract different kinds of students. More detailed investigation could reveal particular types of students for whom high school vocational training does enhance subsequent labor force experiences. We will pursue both of these possibilities in future research. It may also be that selection and tracking mechanisms in high school channel those least likely to succeed, either in or out of school, into non-academic courses. Our results, however, are conditional on test scores and class rank, both common measures of high school performance.

Finally, we addressed the question of persistence over time of early labor force experience. An important question is whether or not early realized experience itself, after controlling for individual characteristics of persons, has an effect on later experience. Is there a "state dependence" effect? Our analysis suggests that if there is such an effect, it does not last long. There seems to be almost no relationship of this kind between weeks worked during the first year after high school graduation and weeks worked four years later. That is, we find no relationship other than that due to individual specific attributes. And random fluctuations in wage rates in the first year or two, resulting from non-individual specific attributes, have almost no relationship to wages three or four years later. Thus our findings do not motivate or increase concern that there may be something intrinsically damaging about particular kinds of early labor force experience. After controlling for measured characteristics of individuals, we cannot identify a lasting effect of initial realized employment on later employment or of initial realized wage rates on later wage rates. We do find, however, that early weeks worked have an effect on wage rates; but even this effect may be rather small after four years.

Although early random fluctuations in weeks worked have little effect on later weeks worked and early random fluctuations in wages little effect on later wages, our results show a distinct trend of greater consistency between one year and the next as persons age. Employment patterns in the third year, for example, are much more likely to carry over to the fourth than are first year patterns to carry over to the second. We find a concomitant increasing wage penalty associated with part-time work, as persons age.

Along with the lasting relationship between high school work experience and later wage rates, as well as employment, we find that the effect of weeks worked in the first year after graduation has a substantial effect on wage rates in subsequent years, although the effect may decline over time.

There are three distinct findings here and we will put them all together. One, the estimated "effects" of high school work experience on weeks worked and wage rates after high school are about the same over the four post-high school years. Two, the effect of early post-high school weeks worked on wage rates in subsequent years is substantial but may decline over time, with weeks worked in the most recent year being more important than experience in earlier years in the determination of current wages. Three, we find no lasting effect of non-individual specific random disturbances in early post-high school weeks worked on weeks worked in later years. And there is no lasting effect of non-individual specific random disturbances in initial wage rates on later wages. Although weeks worked in early years have an effect on later wage rates, as the second finding describes.

Thus our findings suggest, albeit indirectly, that to prepare persons for the labor force, programs that emphasize work experience for youth may be the most likely to succeed. And indirectly, that the concern that low-level or dead-end jobs will hinder subsequent labor market performance is likely to be misplaced. Even though we cannot be sure that the characteristics of those who now work in high school will be gained by those who don't, should future generations of them be got to work, the weight of our evidence is that it offers the best chance of enhancing future labor market experience. Certainly our evidence suggests that it should be given precedence over specific job training in high school. If there is a second priority, our evidence suggests that general academic preparation has a greater payoff than current high school vocational training as well.

Appendix A: Estimation

Consider the weeks worked and the non-school attendance equation--given in equations (5) and (2) in the text--for any one of the four annual time periods:

$$y_i = \begin{cases} Y_i = X_i\beta + \varepsilon_i & \text{if } X_i\beta + \varepsilon_i \leq 52, \\ 52 & \text{if } X_i\beta + \varepsilon_i > 52, \end{cases}$$

$$S_i = Z_i\delta + \eta_i \text{ , with}$$

$$s_i = \begin{cases} 1 \text{ if } S_i \geq 0, \\ 0 \text{ if } S_i < 0, \text{ and} \end{cases}$$

$$\begin{bmatrix} Y_i \\ S_i \end{bmatrix} \sim N \left[\begin{pmatrix} X_i\beta \\ Z_i\delta \end{pmatrix}, \begin{pmatrix} \sigma^2 & \rho\sigma \\ & 1 \end{pmatrix} \right],$$

where small y_i is observed weeks worked and capital Y_i is the unobserved propensity to work and ρ is the correlation between Y_i and S_i.

There are three possibilities: Individual i is in school so that $S_i < 0$; he is not in school and is working less than 52 weeks so that $S_i > 0$ and y_i is observed with $y_i < 52$; he is not in school and is working 52 weeks so that $S_i > 0$ and $y_i = 52$. The probabilities of these outcomes, given X_i and Z_i, are represented respectively by:

1) $\Pr(S_i < 0) = 1 - \Phi[Z_i\delta] = P_{1i}$

2) $\Pr(S_i > 0 \text{ and } y_i \text{ observed, with } y_i < 52)$

$$= \Pr(S_i > 0 | Y_i) f(Y_i)$$

$$= \Phi\left[\frac{Z_i\delta + \frac{\rho}{\sigma}(y_i - X_i\beta)}{\sqrt{1-\rho^2}}\right] \cdot \frac{1}{\sigma}\phi\left(\frac{y_i - X_i\beta}{\sigma}\right) ,$$

$$= P_{2i}$$

3) $\Pr(S_i > 0 \text{ and } y_i = 52)$

$$= \Pr(S_i > 0 \text{ and } Y_i > 52)$$

$$= \Pr(\eta_i < Z_i\delta \text{ and } \varepsilon_i < X_i\beta - 52)$$

$$= \int_{-\infty}^{Z_i\delta} \int_{-\infty}^{X_i\beta - 52} f(\eta_i, \varepsilon_i) d\varepsilon_i d\eta_i$$

$$= \Phi[Z_i\delta, (X_i\beta - 52)/\sigma; \rho],$$

where f is a bivariate normal density function and Φ must now be interpreted as a standardized bivariate normal distribution function with correlation parameter ρ. The log-likelihood function for the complete sample of observations is given by,

$$L = \sum_i^{N_1} \ln P_{1i} + \sum_i^{N_2} \ln P_{2i} + \sum_i^{N_3} \ln P_{3i} ,$$

where the three summations distinguish the groups corresponding to the three possible outcomes. This likelihood function is maximized to obtain estimates of β, δ, σ, and ρ.

There are three expectations that it is useful to distinguish, together with the derivatives with respect to the variables $\underset{\cdot}{x}$. They are given by:

1) $E(Y|X) = X\beta$,

2) $E(y|X) = \Pr(Y \geq 52)\cdot 52 + \Pr(Y < 52)\cdot E(Y|Y < 52)$

$$= \left\{1 - \Phi\left[\frac{52-X\beta}{\sigma}\right]\right\} \cdot 52 + \Phi\left[\frac{52-X\beta}{\sigma}\right] \cdot X\beta - \sigma\phi\left(\frac{52-X\beta}{\sigma}\right),$$

3) $E(y|X \text{ and } s=1) = \Pr(Y \geq 52|s=1)\cdot 52 + \Pr(Y < 52|s=1)\cdot E(Y|Y < 52, s=1)$

$$= \left\{1 - \Phi\left[\frac{52-\mu^*}{\sigma^*}\right]\right\} \cdot 52 + \Phi\left[\frac{52-\mu^*}{\sigma^*}\right] \cdot \mu^* - \sigma^* \phi\left(\frac{52-\mu^*}{\sigma^*}\right) ,$$

where μ^* and σ^* are the mean and standard error respectively of Y given s=1 (the individual is not attending school. They are given by:

$$\mu^* = X\beta + \rho\sigma \frac{\phi(Z\delta)}{\Phi[Z\delta]}, \text{ and}$$

$$\sigma^* = \sigma \left[1 - \rho^2\left(Z\delta \frac{\phi(Z\delta)}{\Phi[Z\delta]} + \frac{\phi(Z\delta)^2}{\Phi[Z\delta]^2}\right)\right]^{1/2}.$$

the derivatives of the expected values with respect to X_j are given by:

a) $\partial E(Y|X)/\partial X_j = \beta_j$,

b) $\partial E(y|X)/\partial X_j = \beta_j \cdot \Phi\left[\frac{52-X\beta}{\sigma}\right]$,

c) $\partial E(y|X \text{ and } s=1) = \beta_j \cdot \Phi\left[\frac{52-\mu^*}{\sigma^*}\right]$.

Recall that our maximum likelihood procedure estimates β_j. The derivative of the expected value of observed weeks worked is given by β_j times the probability that Y is less than 52. At $X\beta = 0$, this derivative is approximately equal to β_j in our sample since $\Phi[52/\sigma]$ is close to 1. It is informative to evaluate the derivative b at say the mean of X. In our sample, $E(y|\overline{X})$ is about 43 weeks. Thus the derivative of y at this point gives a reasonable indication of the effect of a change in an X value, when y is approaching its maximum. Finally, to obtain the effect of a change in an X value on y for persons who elect not to go to school, the derivative c may be used.

The wage specification prescribes only two possible outcomes, analogous to the first two presented above for weeks worked. An individual is either not in the sample with a measured wage ("in school") so that $S_i < 0$; or is not in school and has an observed wage, $S_i \geq 0$ and W_i is observed. These probabilities are given by:

1) $\Pr(S_i < 0) = 1 - \Phi[Z_i\delta]$

2) $\Pr(S_i > 0)$ and W_i observed) [= $\Pr(S_i > 0|W_i)\ f(W_i)$

$$= \Phi\left[\frac{Z_i\delta + \frac{\rho}{\sigma}(W_i - X_i\beta)}{\sqrt{1-\rho^2}}\right] \cdot \frac{1}{\sigma}\phi\left(\frac{W_i - X_i\beta}{\sigma}\right) ,$$

where σ here is the standard deviation of W_i given X_i and X_i represents the right-hand side variables in the wage equation, not all of which corresponds to those in the weeks worked equation. The likelihood function is formed as above. Maximization of it yields estimates of β, δ, ρ, and σ.

Appendix Table B: Estimates of Weeks Worked Equation Parameters for 1973, by Method of Estimation.

Variable	Method of Estimation			
	Tobit with Sample Selection, Persons no in School[1]	Tobit without Sample Selection, Persons not in School	Least Squares, Persons not in School	Least Squares, Persons in School
Hours Worked during High School:				
1 to 5	0.1700 (1.1629)	0.4522 (1.9881)	1.0774 (1.2973)	4.3217 (1.0991)
6 to 10	2.5027 (1.1893)	2.8743 (2.0018)	2.8273 (1.2663)	4.9857 (1.1254)
11 to 15	7.3619 (1.3896)	7.6174 (2.2155)	5.5637 (1.3636)	9.1454 (1.2168)
16 to 20	6.8180 (1.1109)	7.5513 (1.8405)	5.8188 (1.1591)	11.2879 (1.0926)
21 to 25	7.8500 (1.2329)	8.1490 (1.9460)	6.2343 (1.1950)	11.1932 (1.1718)
26 to 30	10.9685 (1.3189)	12.3107 (2.0724)	8.9362 (1.2203)	12.7374 (1.3088)
31 or more	12.5225 (1.1273)	13.8282 (1.6996)	9.1276 (1.0468)	13.4815 (1.1888)
Class Rank in High School	0.2323 (0.0267)	0.0205 (0.0258)	-0.0176 (0.0151)	-0.0709 (0.0147)
Test Score Total	12.1144 (1.4197)	2.8301 (1.5196)	2.4563 (0.9271)	-1.0417 (1.0616)
Job Training during High School	-1.4376 (0.7151)	0.8732 (1.1221)	1.3674 (0.6967)	2.8242 (1.0530)
Race	-1.9184 (1.3714)	-4.2791 (1.3949)	-3.4954 (0.9061)	-3.8434 (1.0742)
Parents' Income	0.6370 (0.1168)	-0.0120 (0.1179)	-0.0615 (0.0730)	-0.3025 (0.0673)
Dependents	4.2551 (0.5997)	2.8608 (0.7401)	1.8077 (0.5091)	3.1252 (0.8161)

(continued)

Appendix Table 8: Estimates of Weeks Worked Equation Parameters for 1973, by Method of Estimation. (completed)

Variable	Method of Estimation			
	Tobit with Sample Selection, Persons not in School[1]	Tobit without Sample Selection, Persons not in School	Least Squares, Persons not in School	Least Squares, Persons in School
On the Job Training Years	--	--	--	--
Rural	-2.5912 (0.9628)	-0.7243 (1.3676)	-0.3656 (0.8149)	2.0630 (1.0417)
Urban	-1.4913 (0.8016)	-2.1929 (1.1968)	-1.2437 (0.7210)	0.5384 (0.6827)
State Wage	-2.1755 (0.9391)	-0.0931 (1.0075)	0.1629 (0.5938)	1.6083 (0.6341)
State Unemployment	-1.0645 (0.4069)	-1.4112 (0.4399)	-0.9576 (0.2604)	-0.0160 (0.2551)
Test Score Missing	33.0777 (4.3147)	6.6222 (4.4468)	5.9033 (2.8358)	-3.3432 (3.5306)
Class Rank Missing	10.1779 (1.9191)	1.9033 (1.8276)	-0.3888 (1.2259)	-2.4658 (1.5017)
Parents' Income Missing	6.6426 (1.7567)	0.4868 (1.7427)	-0.7339 (1.0865)	-4.6648 (1.2153)
Constant	27.2947 (5.3019)	40.2316 (5.8471)	--	--

1. Reproduced from Table 7A, October 1972 to October 1973.

Appendix Table C: Means and Standard Deviations of Variables.

Variable	Mean	Standard Deviation	Sample[m]
Hours Worked during High School:			
1 to 5	0.088	0.2832	A
6 to 10	0.113	0.3161	A
11 to 15	0.083	0.2763	A
16 to 20	0.127	0.3335	A
21 to 25	0.127	0.3324	A
26 to 30	0.110	0.3132	A
31 or more	0.191	0.3929	A
Class Rank in High School	35.833	25.8589	A
Test Score Total	2.677	0.8367	A
Job Training during High School	0.232	0.4219	A
Race	0.162	0.3683	A
Parents' Income	8.846	5.8960	A
Dependents	0.604	0.7817	A
On the Job Training Weeks	1.337	3.0180	A

Appendix Table C: Means and Standard Deviations of Variables.

Variable	Mean	Standard Deviation	Sample[m]
Rural	0.266	0.4416	A
Urban	0.290	0.4539	A
State Wage	4.814	0.6820	A
State Unemployment	8.359	1.9841	A
Education of Mother Less than High School	0.259	0.4380	B
Education of Mother College Degree or More	0.117	0.3209	B
Education of Father Less than High School	0.325	0.4684	B
Education of Father College Degree or More	0.190	0.3923	B
Experience:			
First Year (1972-73)	0.509	0.4532	C
Second Year (1973-74)	0.584	0.4471	C
Third Year (1974-75)	0.730	0.3852	C
Fourth Year (1975-76)	0.830	0.3003	C

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[m] The statistics in this table were calculated from the data used in estimating the 1975-1976 weeks worked model and the 1976 wage model.

Appendix Table C: Means and Standard Deviations of Variables. (Completed)

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m. (continued)
The particular sample used in calculating the mean and standard deviation of each variable is indicated by A, B, or C.

A. Persons working and used in estimation of the 1975-76 weeks worked equation, 2150 observations.

B. Persons used in estimation of the school attendance equation estimated in conjunction with the 1975-76 weeks worked equation, 3100 observations.

C. Persons used in estimation of the 1976 wage equation, 2070 observations.

REFERENCES

Adams, Arvil V. and Mangum, Garth L. 1978. The lingering crisis of youth unemployment. Kalamazoo, Michigan: The W. E. Upjohn Institute for Employment Research

Brown, Charles [this volume].

Bureau of Labor Statistics. 1973. Employment of high school graduates and dropouts October 1972: the high school class of 1972. Special Labor Force Report 155. Washington, D.C.: Bureau of Labor Statistics, Department of Labor.

Ellwood, David [this volume].

Freeman, Richard B. 1976a. The overeducated American. New York: Academic Press, Inc.

__________________. 1976b. Black elite, the new market for highly educated black Americans. The Carnegie Commission on Higher Education. New York: McGraw-Hill Book Company

__________________. 1978. Black economic progress after 1964: who has gained and why. Cambridge, Massachusetts: National Bureau of Economic Research. Working Paper No. 282.

Freeman, Richard B. and Medoff, James L. [this volume].

Griliches, Zvi. 1977. Schooling interruption, work while in school, and the return from schooling. Cambridge, Massachusetts: Harvard Institute of Economic Research, Discussion Paper Number 529.

Griliches, Zvi; Hall, Bronwyn; and Hausman, Jerry A. 1978. Missing data and self-selection in large panels. Annales de L'Insee, Number 30-31.

Griliches, Zvi and Mason, William M. 1972. Education, income, and ability. Journal of Political Economy 80: 74-103.

Hausman, Jerry A. and Wise, David A. 1978. AFDC participation: measured variables or unobserved characteristics, permanent or transitory. Working paper.

______________________. 1979. Attrition bias in experimental and panel data: the Gary income maintenance experiment. Econometrica 47, No. 2, March 1979, pp. 455-473.

Kohn, Mier; Manski, Charles; and Mundel, David. 1976. An empirical investigation of factors influencing college-going behavior. Annals of Economic and Social Measurement; also Rand Corporation Report, F-1470-NSF, 1974.

Levinsohn, Jay R. et al. 1978. National longitudinal study base year, first, second, and third follow-up data file users manual, Volumes I and II, April 1978. Washington, D.C.: National Center for Education Statistics.

Manski, Charles F. and Wise, David A. 1978. Experiences of recent high school graduates. Lexington, Massachusetts: D. C. Heath and Co. pp. 129-162.

Radner, Roy and Miller, Leonard S. 1975. Demand and supply in U. S. higher education. Berkeley: The Carnegie Commission on Higher Education.

Wise, David A. 1975. Academic achievement and job performance. The American Economic Review. June 1975. pp. 350-366.

__________. 1975. Personal attributes, job performance, and probability of promotion. Econometrica 43, No. 5-6, September-November 1975, pp. 913-931.

FOOTNOTES

1. For more detail, see Levinsohn et al. [1978].

2. The number is in fact .068.

3. In Appendix Table B, we have presented an example of estimates for persons in school. For some parameter estimates, differences between the two groups are substantial.

4. We can give a behavioral interpretation to this model by supposing that in each year t each individual attaches some value U_{t0} to going to school and some value U_{t1} to staying out of school. The values may depend, for example, on the expected effect of each of the choices on future earnings. Suppose that both U_{t0} and U_{t1} depend on individual characteristics z_t and random terms e so that $U_{t0} = z_t b_{t0} + e_{t0}$ and $U_{t1} = z_t b_{t1} + e_{t1}$. Then assume that the no-school alternative is chosen if $U_{t1} - U_{t0} = z_t(b_1 - b_0) + (e_{t1} - e_{t0})$ is greater than zero. If we define $S_t = U_{t1} - U_{t0}$, $Z_t = z_t$, $\delta_t = b_{t1} - b_{t0}$, and $\eta_t = e_{t1} - e_{t0}$, we can attach a random choice model interpretation to the specifications defined in equations (3), (4) and (5), with the individual profit specifications interpreted as yielding reduced form parameter estimates. This is similar to the more elaborate specification used by Willis and Rosen [1978].

5. See for example Hausman and Wise [1977]. The expected value of Y_i, given that individual i is in the sample is given by:

$$E(Y_i | s_i = 1) = X_i\beta + \rho\sigma \frac{\phi(Z_i\delta)}{\Phi[Z_i\delta]} .$$

6. A maximum likelihood method for doing this is laid out by Hausman and Wise [1977].

7. We have not considered hours worked per week.

8. The expected value of weeks worked is given by, $E(y) = Pr(Y>52) \cdot 52 + Pr(Y<52) \cdot E(Y|Y<52)$.

9. This could be done by estimating the four weeks worked equations jointly with the four sample selection equations. Such a procedure would also yield estimates of the correlations among the random terms in equations (2) and (5). But it also presents substantial computational complexity.

10. Even though we have used only a subsample of the whole data set, to get a given number with "good" weeks worked data, we have to have a much larger total sample size if only persons never in school are considered to have observations on the y_t.

11. By forming for example the appropriate inverse Mills ratio and entering it as a variable in each of the weeks worked equations.

12. It may be technically inconsistent to use weeks worked while at the same time using the logarithm of wages, since earning is usually assumed to be lognormal. That is,

$$E = Y \cdot H \cdot W, \text{ and } \ln E = \ln Y + \ln H + \ln W,$$

where E is annual earnings, H is hours per week, and W is the hourly wage rate. But since our weeks worked results suggest a slightly better fit using weeks rather than their logarithms, we have reported these results.

13. We predicted the conditional expectation of S_1, S_2, and S_3, given that a person was in the sample. We also predicted the sum of the schooling variables, conditional upon being in the sample.

14. Griliches, Hall, and Hausman [1978], found that corrections for the endogeneity of schooling increased the coefficient for schooling in their wage equation, even after correcting for sample selection. Our attempts to instrument schooling suggested, however, that the schooling coefficients in our model may be biased upward.

15. We experimented with two approaches. One was to include in the no-wage group all persons without a wage, whether they were students or unemployed non-students. The status equations in this case are simply sample selection equations; they cannot be interpreted as school attendance equations. The other approach was to eliminate altogether from consideration non-students who were also unemployed in the October period being considered. The status equations may again be interpreted as school attendance equations, but the wage equation estimates are biased to the extent that they are affected by the elimination of unemployed non-students. In practice, the two procedures led to very similar wage equation estimates. (In fact, even the estimates in the status equations were affected very little by the selection procedure used.) The results reported below were based on the second method.

16. This is consistent with the findings of Freeman [1978] in a current NBER working paper.

17. The appropriate comparison may be the high school wage versus the wage with additional schooling -- say a college degree. But the appropriate high school wage may be local, while the college wage may reflect a national market.

18. For a detailed discussion of the determinants of college going behavior, see Manski and Wise [1978], Radner and Miller [1975], or Kohn,

Manski and Mundell [1974]. Work of Manski and Wise currently in progress suggests that blacks, once admitted to schools, are less likely than whites to choose four-year colleges, after controlling for SAT scores, parents' income, and other variables.

19. The estimated effects of hours worked in high school are somewhat lower with than without them and the estimated effects of high school training somewhat lower as well. The school attendance equations estimated with the wage rate equations as shown in Table 8B include these two variables. Their inclusion in the wage sample selection equation has little effect on the wage equation parameters.

20. More precisely, the estimates indicate a substantial relationship if hours worked exceed 15.

21. For more details, see Figure 1 and the text discussion of it, and Appendix A.

22. $\Phi[(52-X\beta)/\sigma] = \Phi[(52-30)/20] = \Phi[1.1] = .8643$, if $X\beta$ is 30 and σ is 20. Sigma is close to 20 in each of the four years. For more details see Appendix A.

23. The other variables included in the regression are: Number of Siblings 0.01 (0.01), State Wage -1.62 (0.90), State Unemployment -0.03 (0.38), Rural -1.87 (1.03), Town -1.85 (0.99), Urban -1.88 (0.98), South -0.19 (1.25), East -1.32 (1.19), West -0.55 (1.38), Test Score Missing -9.37 (2.76), Class Rank Missing 0.55 (1.18), and Parents' Income Missing 1.63 (1.05).

24. Griliches [1977], in an analysis of the Parnes National Longitudinal Survey, as well as National Longitudinal Study data, also found that work in high school was virtually unrelated to family socioeconomic variables.

25. At least in the first two years the estimates are not precisely measured. The state wage may be considered as an instrument for the individual wage. Possibly it is too weakly related to individual wages to pick up any labor supply effect that might be present. A more highly parameterized instrumental variables specification of the model might yield a different result. One interpretation of our results is that the higher the "going" wage the less likely are employers to be willing to fill jobs with youths.

26. Indeed the estimates imply a relationship that is slightly U-shaped, with hours between 16 and 30 generally associated with slightly lower wage rates than high school hours of either more than 30 or greater than zero but less than 16.

27. Of course, high school work could enhance one's ability to learn from later work experience, and thus a decline in the effect would not necessarily be expected.

28. If the same specification as shown in Table 8A is used, but with two high school training variables -- one for persons with a high school degree only, and a second for persons with post-secondary education -- the results are similar; the relevant coefficients are not significantly different from zero for either group.

29. We cannot rule out the possibility that family income captures individual attributes contributing to job performance and associated with income, although we think this is unlikely having controlled for school performance and other characteristics. Wise [1975a, 1975b] found that family background was not related to earnings or performance in a given corporate job setting, after individual academic and non-academic characteristics were controlled for.

30. This is consistent with other estimates of this type. See, for example, Griliches and Mason [1972] or Hausman and Wise [1972]. A comparable monthly coefficient in Hausman and Wise, for example, is .0063, versus our estimate of .0060 in 1976.

31. In fact, the number of October time periods that the person was in school.

32. We experimented with the instrumental variable approach described in Section II -- using the expected value of school in a given year, conditional on being in the labor force in that year. It did indeed yield lower estimates, but because we were not satisfied with the procedure in general, we have reported the uncorrected estimates. In subsequent work, we will set up a more highly specified simultaneous equations model that allows for the simultaneous determination of school and work experience, together with a sample selection equation. Such a system is cumbersome to apply over repeated years when the β parameters are estimated separately for each year. Because this was a primary concern of our analysis, we elected to work with a less complicated specification in this investigation.

33. The increase in salary with experience is generally higher for white collar workers than for blue collar workers.

34. See, for example, Freeman [1976a].

35. If there is an endogeneity bias with respect to experience, its sign is not clear. Because schooling is positively related to the error in the wage equation, and experience is cumulated only if a person is not in school, the estimates would tend to be biased downward. On the other hand, the error in weeks worked is positively related to school attendance. Experience may also be endogenous in that it may be deter-

mined in part by past wages and the wage disturbances are correlated over time.

36. And again, there may be some compounding of results because of the entry of recent college graduates, in the last time period.

37. Although this terminology is intuitively appealing when there are discrete distinct states that are not artificial divisions of a continuous measure, it may be a misnomer here. Still we will stick with it.

38. A straightforward way to estimate the population covariance is to obtain joint maximum likelihood estimates of the parameters, including a covariance term, for each pair of years. This is expensive when different β parameters are allowed for each year. An easier and less expensive procedure is to use estimates for individual years (like ours) to obtain consistent estimates of the β parameters for each year; and then to use them in a second maximum likelihood stage to estimate covariances, assuming the means implied by the $\hat{\beta}$'s from the first stage. On the basis of preliminary analysis, however we concluded that these alternatives would not change the conclusions that we reach on the basis of covariance estimates conditional on being in the labor force.

These same alternatives could be used to obtain population covariances among the weeks worked disturbances, with the added complication of the upper limit on weeks. We will pursue this in subsequent work. But as with the wage disturbances, we concluded that the substance of our conclusions would not be changed by a more precise and detailed analysis.

39. For a more detailed analysis of state dependence following a somewhat different procedure, see Ellwood [this volume]. Related analysis is also contained in Brown [this volume].

40. The correlation for any two periods is based on persons who were in the sample in both periods. The residuals are calculated conditional on being in the sample (not in school).

41. We also calculated a correlation matrix for the logarithm of nominal wages based on the sample of persons who had a recorded wage rate in each period (447 out of 3280 who worked in at least one of the five periods). The correlations are quite close to those shown here although the correlations between adjacent years are a bit larger in the later years -- .811 between 1975 and 1976 -- indicating somewhat greater stability after four years than for the sample as a whole. The correlation between 1972 and 1976 is .319, slightly smaller than the one shown in the text.

42. Although our procedure is consistent, it is not efficient. A correct procedure would use a minimum modified χ^2 procedure analogous to generalized least squares. Given our purpose and relatively large sample size, we did not pursue this approach.

43. Recall that if all variation were due to individual specific terms, correlations over time would be one; they would also be one if state dependence were extreme so that persons could not "change states".

44. The correlation matrix of weeks worked disturbances is based on an earlier set of statistical results that are substantially the same as those reported in Table 7. A correlation matrix based on nominal weeks worked for persons always in the sample--728 out of 2933 who were not in school in any of the years--reveals no systematic differences from those shown here.

45. These conclusions remain unchanged if the matrices are based only on persons who were not in school in any of the four years.

46. Relationships like those described in this section hold as well for persons who were in the labor force in each of the periods, who had no post-high school training.

47. See greater elaboration on this point in Ellwood [this volume].

Teenage Unemployment: Permanent Scars on Temporary Blemishes

David Ellwood

Teenage unemployment poses a puzzle for economists. Its causes and consequences are not well understood because of conflicting economic analyses. The human capital model suggests that since investment should be quite heavy in the early years, teenage unemployment carries with it heavy costs. But search theory suggests that shopping around is a necessary and desirable activity, particularly for those with little information about opportunities in the labor market. There is also concern that early labor force attachment may be weak, raising the possibility that early unemployment may just represent consumption of leisure. This paper focuses on the longer term consequences of early spells out of work for male teenagers.

The fundamental problem in capturing the long-term effects of unemployment is separating differences in employment and wages which are causally related to early unemployment from the differences which are due to unobserved personal characteristics correlated with early unemployment. Whereas elsewhere in economics, researchers routinely assume homogeneity of tastes and preferences, heterogeneity lies at the very heart of the issue here. Separating the individual component is the primary challenge faced in this paper.

This paper is divided into three sections. The first simply describes the early labor market experience of the young men in this sample. Strangely there is little published data which trace the experience of a complete cohort over four years. In most other work the high rates of attrition and re-entrance into the sample over the period at least open the possibility of distorting the underlying pattern.

The second section extends the work of Heckman and Chamberlain to test the long term effects of early employment on future employment. The final section uses a Sims type causality model to measure the impact of work experience on wages.

I conclude that the effects of a period without work do not end with that spell. A teenager who spends time out of work in one year will probably spend less time working in the next than he would have had he worked the entire year. Furthermore the last work experience will also be reflected in lower wages. At the same time, my data provide no evidence that early unemployment sets off a vicious cycle of recurrent unemployment. The reduced employment effects die off very quickly. What appears to persist are effects of lost work experience on wages.

Scars -- In Theory and Practice

It is useful to begin by examining the implications of early unemployment according to several more common labor theories. Perhaps most prominent in its prediction of long-term effects is human capital theory. While the theory isn't concerned with early unemployment inducing later unemployment, its emphasis on human investment early in the job career to explain the concave pattern of aggregate age-earnings profiles implicitly imposes heavy costs on the unfortunate young person who misses out on early investment opportunities. If no investment takes place during the period without employment, the entire profile is shifted back. Even if retirement is also delayed, the present value of the entire earnings streams must now be discounted over the lost time.

The dual labor market theorists paint an equally bleak picture. Poor work habits develop over the periods of discouragement, catalyzing weak labor force attachment and alienation. The result is a vicious cycle of unemployment followed by deterioration followed by more unemployment. Pervading the institutional literature is the related notion of tracking. Teenagers face only a limited number of entry-level jobs which lead to better jobs. Those who miss good jobs early are permanently tracked onto inferior ladders.

One troubling question is whether early unemployment is largely a result of a job shortage or of weak labor force attachment. Most theories which predict long-term impacts of unemployment emphasize the involuntary nature of early unemployment. If much of it is "voluntary," it still may be reasonable to consider whether there are long-term consequences. Teenage unemployment cannot be strictly voluntary since it is so strongly counter-cyclical. But it is possible that some portion of the problem is due to weak attachment. Young people may take jobs only when they are readily available. Early experience may quicken labor force attachment and reinforce desirable work skills. If it is considered socially desirable to hasten the assimilation process, then it would be desirable to make jobs readily available to the young.

A slightly more sophisticated argument emphasizes the severe informational problems of the young in the labor market. Teenagers and employers are involved in an elaborate game of mixing and matching skills and jobs, but there is relatively little information available to either party. The employers rely heavily on evidence of past work experience in making hiring decisions because they need to separate persons with poor work skills and weak attachment from those with superior work qualities. Employers avoid hiring workers who have been out of school for some time but have little experience, so those workers who were involuntarily unemployed are inappropriately typed as poor workers. The problems may be exacerbated in recessionary times. If employers are slow to adjust their expectations for experience from young applicants, cohorts entering a weak labor market will suffer. Of course, permanent damage need not occur at all. Early unemployment may simply be productive job search or simple consumption of leisure.

There is a small but rapidly growing literature testing the long-term effects of early spells of unemployment. (See for example Becker and Hill, 1978; Stevenson, 1978). These papers conclude that early unemployment has sizeable long-term effects. The methodology usually involves regressions of wages or weeks worked of persons beyond their teens on duration and/or spells of teenage unemployment several years earlier. Although most pay lip service to the difficulty of controlling for individual differences, it is typical to include several background variables as a control in the equations. This methodology is troubling. If there is a true job shortage employers are likely to hire the highest quality workers first. If early unemployment is in part a reflection of weak attachment, then some persons with unemployment are also low quality workers. In either case, early unemployment is certain to be highly correlated with aspects of worker quality. The findings of these studies document persistence very convincingly but serious questions remain about whether early experience has causal effects in later economic behavior.

It is the conclusion of this paper that while long-term effects do exist, they may be a good deal smaller than the literature suggests.

The Data

Current published data tends to obfuscate early patterns of market experience. Data from the Current Population Survey are currently published by age group and school enrollment status. Throughout this paper, I will concentrate only on those persons out of school. I see much fewer possibilities for long-term effects of unemployment during school. The composition of the 16-19 year old out of school labor force is very different from that of the 20-24 age group. The 16-19 year old group includes early dropouts and high school graduates. The 20-24 year old group includes persons with little school but 8 years of experience along with recent college graduates. To look across different age groups and to draw conclusions about the patters of unemployment as persons age is to invite error.

Ideally, one should like to follow a cohort of persons permanently out of school over five or ten years. The National Longitudinal Survey of Young Men -- the so-called "Parnes data" -- allows such an examination. Some 5225 young men between the ages of 14 and 24 were interviewed in 1966. They were then reinterviewed annually through 1971, then again in 1973, and again in 1975. Typically, respondents were interviewed in November about their current labor force status and most recent wage as well as about their experience over the past year. The sample chosen for analysis here was a group of roughly 750 young men who left school "permanently" in 1965, 1966 or 1967 with less than 14 years of education. Unfortunately, this period was the height of the Vietnam war. Thus, slightly over half the sample is not observed in the four full years after they left school, primarily because of military service. The 364 young men who remain do appear to be somewhat less prone to unemployment and time out of the labor force. Persons who were observed in the first full year out of school but were not observed in some later year had a labor force participation rate of 84.1 percent, an unemployment rate of 7.1 percent and an employment rate of 78.2 percent. Persons who remained in the sample had rates of 86.1 percent, 5.0 percent, and 81.8 percent respectively. This sample selection is an obvious source of potential bias and will be addressed in more detail later.

Another well known "problem" with the Parnes data is that they show very different rates of employment and unemployment than do published statistics derived for the CPS. The longitudinal data used here show much higher employment rates and lower unemployment rates than the CPS data. For a discussion of the likely reasons for these differences see Freeman and Medoff (1979b). The sample selection and CPS comparison suggests that the NLS sample may miss some of the longer-term unemployed persons, for whom unemployment could have the most serious consequences. Thus, the current sample could serve to under-represent the long-term consequences of early labor market experience.

Few of the young men in the survey data leave school in November. In the year of leaving school, retrospective labor force figures cover both time in and out of school. After numerous attempts to adjust for the problem, I finally decided to simply omit the first part-year of experience. In later sections when I refer to the first year of experience, I refer to the first full survey year after graduation or dropout.

I. THE EARLY LABOR MARKET EXPERIENCE

The labor market position of young men improves dramatically during the first four years out of school. Table 1 shows that while an average of nearly 20 percent, are without work in the first year, only 10 percent are not working 3 years later. Labor force participation rates rise precipitously, from 86 percent to 95 percent. The marked improvement is countercyclical in this case since for roughly two-thirds of the sample (those leaving school in 1966 and 1967) the fourth full year out of school comes during 1970 or 1971 -- recessionary years. Indeed, if the overall economic picture had remained stable over this period, even more rapid improvement would likely have occured. Almost immediately, however, the unemployment rate shows up as a poor indicator of labor market performance for this group. While the other statistics, most notably, the employment ratio, show clear improvement over time, the unemployment rate follows no clear pattern. This latter statistic badly misrepresents the trend in labor force position. In these retrospective figures, unemployment appears to mean something different to persons one year out of school than to persons four years out. As the young men age, they may become increasingly reluctant to report themselves as out of the labor force even if they are not spending time in productive job search.

Table 1

Unemployment Rate, Employment Ratio and Labor Force Participation Rate For Young Men During First Four Years After Leaving School in 1965, 1966, or 1967 With Less Than 13 Years of Schooling

	Unemployment Rate*	Employment Rate**	Labor Force Participation Rate***
Year 1	5.0	81.8	86.1
Year 2	6.4	84.7	90.5
Year 3	4.8	89.3	93.8
Year 4	5.4	90.0	95.0

* average weeks unemployed/average weeks in labor force

** average weeks employed/52

*** average week in labor force/52

Another alternative is that in later years only a hard core cannot find jobs. These persons become discouraged and drop out of the labor force. Either way the distinction between unemployment and time out of the labor force is blurred.

The steady improvement of the cohort masks remarkably dynamic labor force patterns. The initial years of employment experience are pocketed with spells of unemployment and time out of the labor force. Only 18 percent of all young men in this sample have four year employment histories unmarred by a spell out of work. Table 2 shows that nearly 40 percent of all young men spend time out of the labor force in their first year, while just over one quarter report unemployment. Overall, 57 percent of these young men spent some time out of work. The probabilities of adverse experiences decline substantially over the period. Yet even in the fourth year out of school when the overall employment ratio is 90 percent, almost 40 percent spend some time not employed. And while the labor force participation rate is hovering at 95 percent in that fourth year, one quarter spend some time neither working nor looking for work. These results reinforce those of Clark and Summers (1978) who have shown that CPS data suggest extremely dynamic labor market behavior.

Perhaps the most dramatic result in these first few tables is the prominence of time out of the labor force. Nearly 40 percent of the sample self report time spent neither working nor looking in the first years. These 40 percent report average spells of 18 weeks -- more than four months -- during a period of very low unemployment. Perhaps these are discouraged workers. Yet three-quarters of them spent no time

Table 2

Probability of Unemployment, Time Out of the Labor Force and Time Not Employed During First Four Years After Leaving School

	Probability of Unemployment	Probability of Time Out of Labor Force	Probability of Time Not Employed
Year 1	26.9%	40.1%	56.6%
Year 2	27.5	31.9	51.1
Year 3	23.0	23.6	40.9
Year 4	21.9	24.1	38.2

unemployed at all during that first full year! Of course, some may have had severe unemployment problems in the part year preceding the first survey year. Still, four months is a remarkably long time to be discouraged, particularly when one's peers are reporting a 5 percent unemployment rate. The sample selection rules, which appear to discriminate against the non-employed, make the results seem even more dramatic. The rapid rise in labor force participation rates and employment rates during the downward swing of the business cycle must almost certainly indicate increasing labor force attachment.

One important concern is whether to regard unemployment as a separate experience from time out of the labor force. The evidence cited thus far suggests little distinguishes the two. Retrospective unemployment figures do not appear to capture the essence of the employment situation. While the distinction between those actively seeking work and those who are not seems particularly important in this group, the line is poorly drawn using retrospective employment figures. Of course, few labor force statistics are derived from retrospective data. Still, the standard CPS question about whether the teenager has done anything to look for work in the past four weeks (a specific method must be listed) may not separate them too much more efficiently.

Unfortunately, if it is difficult to separate the truly unemployed from those with weak labor force attachment in surveys, it may be equally difficult for employers. Thus, those persons who are seriously searching for work but have been unable to find it may suffer from guilt by association.

This brief section has painted a pattern of change and diversity. Early in their career young men spend a great deal of time without work. By their forth year, however, most workers are settling into a more stable and presumably permanent work situation. The next section shows that while the early years are periods of rapid improvement for the young men overall, adverse experiences persist.

The Persistent Pattern of Adverse Labor Market Experiences

Early labor market experiences foretell future ones. Persons who escape unemployment early will likely escape it later. Figures 1, 2, and 3 are probability trees for unemployment, time out of the labor force, and time not employed for the four periods. Each branch corresponds to one period. A 1 indicates that unemployment or non-employment was experienced in the period, a 0 indicates that it was not. Above the line in any branch is the probability of being in that state conditional on being at the previous branch. Below the line in parenthesis is the unconditional probability of being on that branch (or the proportion of all persons who are found on that branch). The bottom number is the average weeks of unemployment in that period by persons on that branch. Thus in Figure 1, 53.1 percent of persons who had been unemployed in their first year were unemployed in their second year. 14.3 percent of all persons had unemployment both periods and these persons averaged 14.2 weeks of unemployment in the second year.

All three figures demonstrate striking persistence in the labor force experiences. The probability of unemployment (non-employment) in the second period conditional on first period spells is .531 (.631), while those who escaped early problems have only a .180 (.354) probability

Figure 1: Probability Tree of

Weeks Unemployed in First Four Full Years Out of School

N = 364

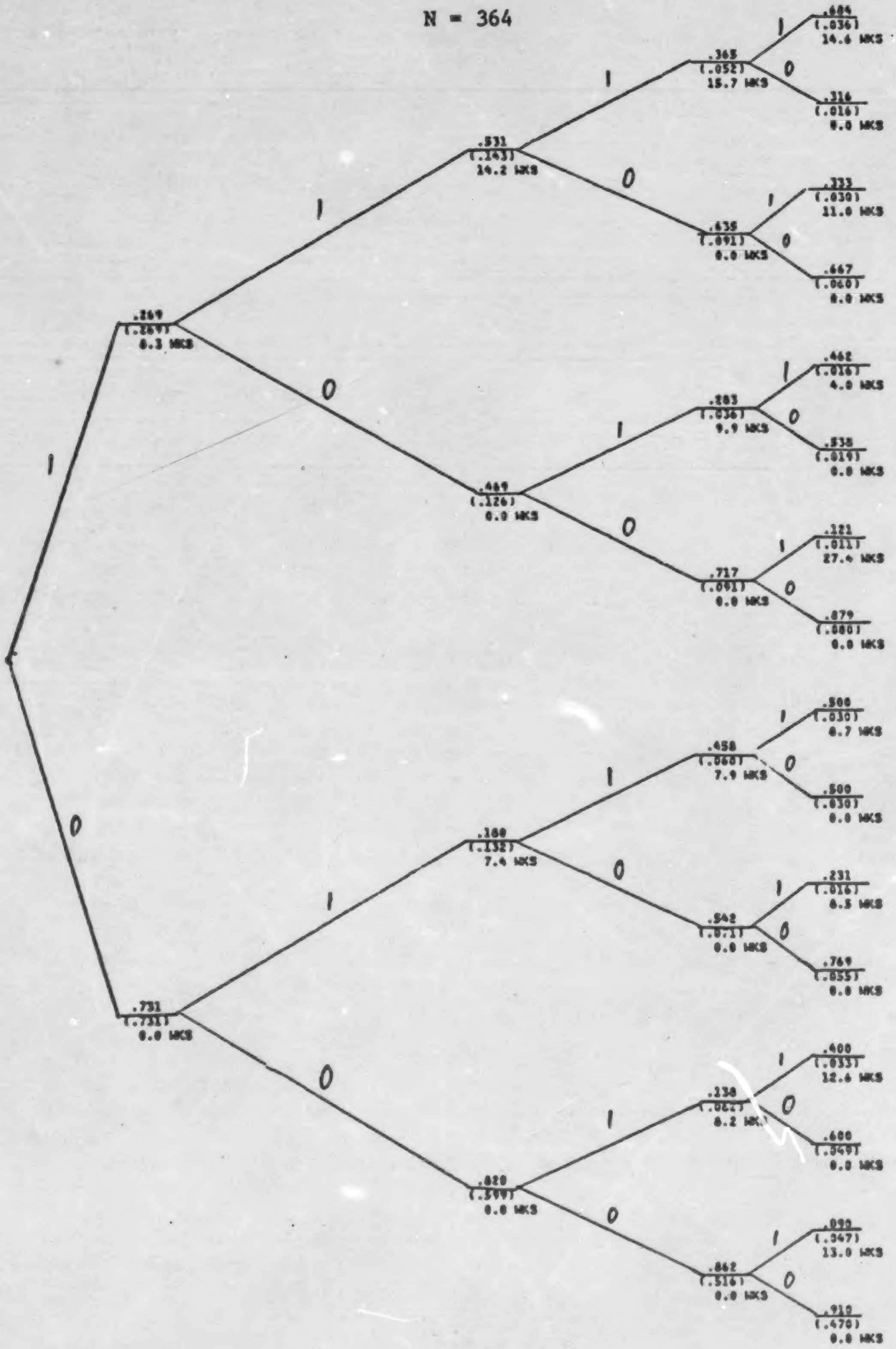

.684
(.036)
14.6 WKS
1
.365
(.052)
15.7 WKS
0
.316
(.016)
0.0 WKS
1
.531
(.143)
14.2 WKS
0
.333
(.030)
11.0 WKS
1
.635
(.091)
0.0 WKS
0
.667
(.060)
0.0 WKS
1
.269
(.269)
8.3 WKS
.462
(.016)
4.0 WKS
1
.283
(.036)
9.9 WKS
0
.538
(.019)
0.0 WKS
0
1
.469
(.126)
0.0 WKS
0
.121
(.011)
27.4 WKS
1
.717
(.091)
0.0 WKS
0
.879
(.080)
0.0 WKS
1
0
.500
(.030)
8.7 WKS
1
.458
(.060)
7.9 WKS
0
.500
(.030)
0.0 WKS
1
.180
(.132)
7.4 WKS
0
.231
(.016)
6.5 WKS
1
.542
(.071)
0.0 WKS
0
.769
(.055)
0.0 WKS
1
.731
(.731)
0.0 WKS
0
.400
(.033)
12.6 WKS
1
.138
(.082)
8.2 WKS
0
.600
(.049)
0.0 WKS
1
.820
(.599)
0.0 WKS
0
.090
(.047)
13.0 WKS
1
.862
(.516)
0.0 WKS
0
.910
(.470)
0.0 WKS

Figure 2: Probability Tree of

Weeks Out of the Labor Force in First Four Full Years Out of School

N = 364

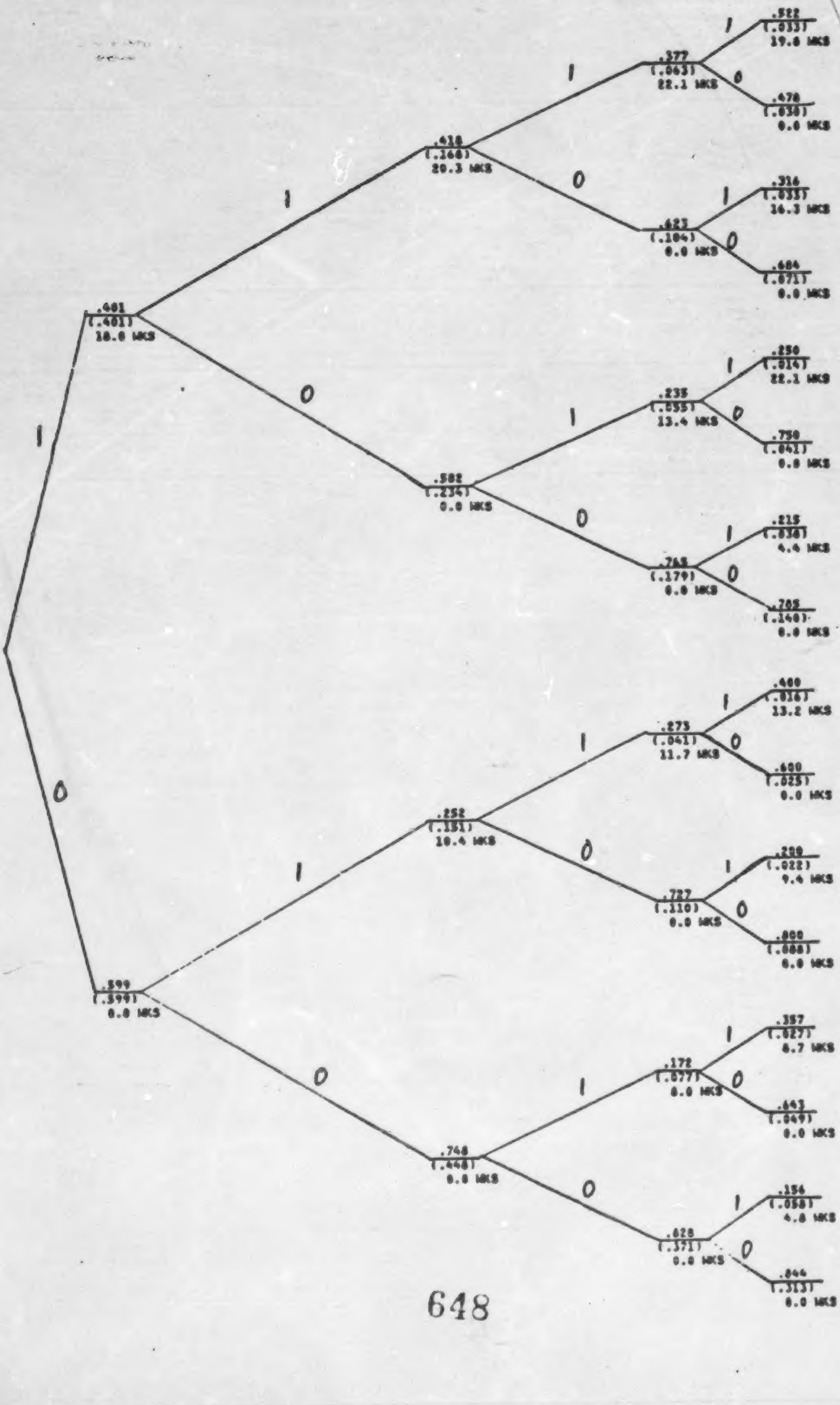
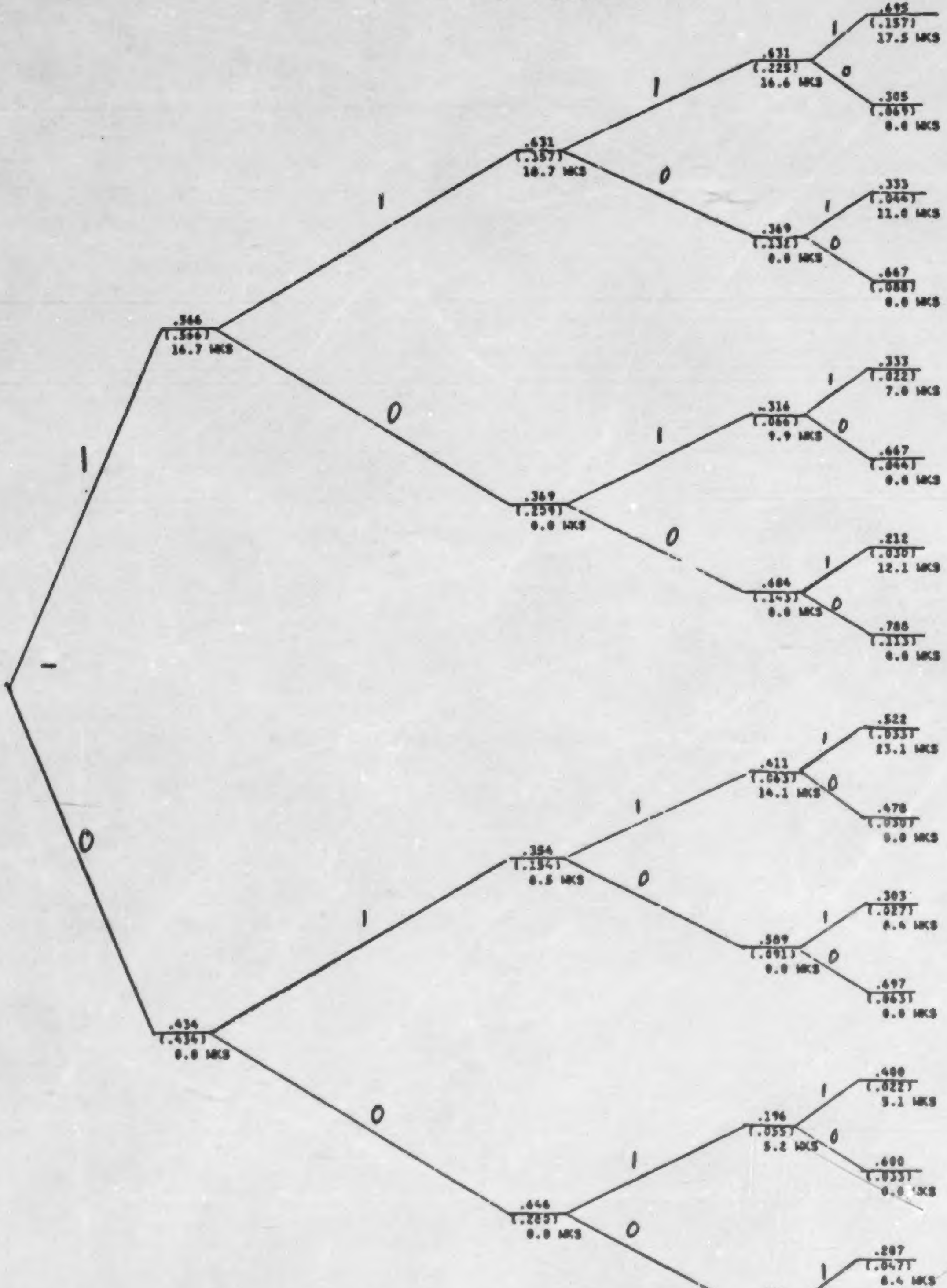

.522
(.033)
19.8 WKS
1
.377
(.063)
22.1 WKS
0
.478
(.030)
0.0 WKS
1
.418
(.168)
20.3 WKS
0
.316
(.033)
16.3 WKS
1
.623
(.104)
0.0 WKS
0
.684
(.071)
0.0 WKS
1
.401
(.401)
18.0 WKS
.250
(.014)
22.1 WKS
1
.235
(.055)
13.4 WKS
0
1
.750
(.041)
0.0 WKS
1
0
.582
(.234)
0.0 WKS
0
.215
(.038)
4.4 WKS
1
.765
(.179)
0.0 WKS
0
.785
(.140)
0.0 WKS
.400
(.016)
13.2 WKS
1
.273
(.041)
11.7 WKS
0
0
.600
(.025)
0.0 WKS
1
.252
(.151)
10.4 WKS
0
.200
(.022)
9.4 WKS
1
.727
(.110)
0.0 WKS
0
.800
(.088)
0.0 WKS
.599
(.599)
0.0 WKS
.357
(.027)
6.7 WKS
1
.172
(.077)
0.0 WKS
0
0
.643
(.049)
0.0 WKS
1
.748
(.448)
0.0 WKS
0
.156
(.058)
4.8 WKS
1
.828
(.371)
0.0 WKS
0
.844
(.313)
0.0 WKS

Figure 3: Probability Tree of

Weeks Not Employed in First Four Full Years Out of School

N = 364


-
1
.566
(.566)
16.7 WKS
1
.631
(.357)
10.7 WKS
1
.631
(.225)
16.6 WKS
1
.695
(.157)
17.5 WKS
0
.305
(.069)
0.0 WKS
0
.369
(.132)
0.0 WKS
1
.333
(.044)
11.0 WKS
0
.667
(.088)
0.0 WKS
0
.369
(.259)
0.0 WKS
1
.316
(.066)
9.9 WKS
1
.333
(.022)
7.0 WKS
0
.667
(.044)
0.0 WKS
0
.684
(.143)
0.0 WKS
1
.212
(.030)
12.1 WKS
0
.788
(.113)
0.0 WKS
0
.434
(.434)
0.0 WKS
1
.354
(.154)
6.5 WKS
1
.411
(.063)
14.1 WKS
1
.522
(.033)
23.1 WKS
0
.478
(.030)
0.0 WKS
0
.589
(.091)
0.0 WKS
1
.303
(.027)
8.4 WKS
0
.697
(.063)
0.0 WKS
0
.646
(.283)
0.0 WKS
1
.196
(.055)
5.2 WKS
1
.400
(.022)
5.1 WKS
0
.600
(.033)
0.0 WKS
0
.804
(.225)
0.0 WKS
1
.207
(.047)
6.4 WKS
0
.793
(.179)
0.0 WKS

of unemployment (non-employment). By the fourth period, boys with three straight years with unemployment are 7 times more likely to become unemployed than those with three straight years without it.

This sort of probability tree is common in the literature (see Heckman and Willis, 1977; Heckman, 1978a and 1978b); however, the patterns can be misleading. If spells are long, say 10 weeks, and if spells are distributed randomly throughout the year, then 20 percent of all the unemployed in one year will have spells which overlap into the next one. This would cause a much higher probability of unemployment in the second year conditional on having experienced it in the first, regardless of the underlying pattern. In this sort of table, there is no straightforward way of making an adjustment for this problem.

Happily, overlap problems do not affect probabilities of third or fourth period events conditional on the first period event. Table 3 reveals that persons with poor first period records are likely to have poor records three or four years later. Persons who spent time out of work in the first period have a .447 probability of similar problems in the final year as contrasted to a .297 probability for those persons with uninterrupted work histories in the first year.

A somewhat more appealing measure of persistence is a simple correlation matrix. Table 4 provides the correlations for weeks of unemployment over the first four years and for the weeks not employed. Once again the persistence is prominent, but not quite so prominent as might be expected. Weeks not employed shows a one year correlation of about .5, but it decays rapidly. Within two years the value falls to around .25. Remarkably, weeks unemployed show far less persistence and

Table 3

Probabliity of Adverse Market Experiences in Later Years Conditional on Early Experience

	Unemployment	Time OLF	Time Not Employed
P(1 in year 2/ 1 in year 1)	.531	.418	.631
P(1 in year 2/ 0 in year 1)	.180	.252	.354
P(1 in year 3/ 1 in year 1)	.327	.294	.514
P(1 in year 3/ 0 in year 0)	.194	.197	.272
P(1 in year 4/ 1 in year 1)	.345	.294	.447
P(1 in year 4/ 0 in year 1)	.172	.205	.297

Table 4

Correlation Matrix for Weeks Unemployed and Weeks Not Employed During the First Four Years Out of School

	Weeks Unemployed			
Weeks Unemployed	Year 1	Year 2	Year 3	Year 4
Year 1	1.00	.27	.20	.08
Year 2		1.00	.27	.26
Year 3			1.00	.39
Year 4				1.00

	Weeks Not Employed			
Weeks Not Employed	Year 1	Year 2	Year 3	Year 4
Year 1	1.00	.54	.34	.25
Year 2		1.00	.46	.34
Year 3			1.00	.47
Year 4				1.00

the pattern of decay is erratic. Adjacent year correlations (σ_{12}, σ_{23}, σ_{34}) show some stability, but hover at only about .3, a figure roughly comparable to the correlation between weeks not employed one or two years removed. The correlation between unemployment in the first and third year (σ_{13}), shows evidence of slight decay, but σ_{24} shows no such evidence. Then, dramatically, σ_{14} falls to .08. The unorthodox behavior of the unemployment figures reinforces once again the earlier concerns about the quality of unemployment measures (at least this retrospective measure) for this age group.

Both the unemployment and non-employment correlations are more stable than would be generated by a first order Markov process. The stability suggests that individual differences are an important part of the underlying process or that the process is of higher order. Unemployment and non-employment are not events randomly distributed over this population of young men. If early unemployment or non-employment is nothing more than search and matching of workers and jobs, then for some at least, the process is quite protracted. Since adverse employment patterns are a problem of a sub-class of youngsters, programs to aid them ought to be targeted to those with early problems.

The critical question of this paper still remains: is the persistence a reflection only of individual differences or is future employment causally related to past experience?

II. THE IMPACT OF EARLY UNEMPLOYMENT ON FUTURE UNEMPLOYMENT -- HETEROGENEITY AND STATE DEPENDENCE

Persistence of labor market behavior has been noted in numerous other settings, most notably in the labor force participation of married women. A newly developing literature seeks to separate the effects of individual differences in behavior -- heterogeneity -- from changes in behavior induced by a previous event -- state dependence. The unique character of longitudinal data allows one to control for unobserved individual characteristics in a way that no strictly cross-sectional data set does. Although there are serious conceptual problems with this formulation, the following model in continuous time will help illustrate the methodology currently employed in the literature. The problems will be considered later.

$$Y_{it} = X_{it}\beta_t + \gamma_t Y_{it-1} + \delta_{it} + U_{it}$$

Here Y_{it} is the time person i was in a particular state during period t (i.e. weeks worked), X_{it} is a vector of exogenous variables, δ_{it} is an individual constant, U_{it} is a random component. This is simply a model of a first-order Markov process with an individual component. In this example, δ_{it} is the control for heterogeneity, γ_t is the test of state dependence. Such an equation cannot be estimated from cross-sectional data because there will be more parameters than observations since each individual is accorded his own intercept. Cross-sectional estimates made without the inclusion of δ_{it} will create upward bias in the state dependence coefficient unless that part of δ_{it} which is correlated with Y_{it-1} is fully captured by a linear combination of the X's.

By imposing restrictions on δ_{it}, one can estimate γ_t from longitudinal data. The individual component can be controlled using data from previous years. The simplest assumption is to fix the individual component over time, $\delta_{it} = \delta_i$. To simplify the example further, assume $\beta_t = \beta$, $\gamma_t = \gamma$ and that Cov $(U_{it}, U_{it-1}) = 0$. Simple differencing eliminates the nuisance parameter δ_i. Thus:

$$Y_{it} - Y_{it-1} = (X_{it} - X_{it-1})\beta + \gamma(Y_{it-1} - Y_{it-2}) + U_{it} - U_{it-1}$$

Of course all exogenous variables which are invariant over time are also eliminated with this approach. Since the focus here is with the state dependence parameter, γ, this is a source of no concern. The term $(Y_{it-1} - Y_{it-2})$ is now negatively correlated with the error term, so OLS results will be negatively biased. However, Y_{it-2} and X_{it-1} can be used to instrument this term and consistent results will be generated. Note that absolutely no distributional restrictions are imposed on the δ_i across individuals since they are simply differenced away.

Heckman (1978a, 1978b) has developed an appealing and more general counterpart to this model for the discrete case. Heckman's model transforms the dichotomous variable into a continuous one by assuming the event occurs whenever a continuous latent variable (Y^*_{it}) crosses a threshold -- here assumed to be zero. A dummy variable d_{it} is assumed to be one when $Y^*_{it} > 0$ and zero otherwise. Exogenous variables X_{it} are allowed. Using a variance components error structure in Heckman's model, we can allow each individual to have his own individual component, δ_{it}, freely varying over time for the moment. One case of Heckman's somewhat more general model is then:

$$Y^*_{it} = X_{it}\,\beta_t + \sum_{j=1}^{k} \gamma_{it-j}\, d_{it-j} + \delta_{it} + U_{it}\ .$$

Setting $\gamma_{it-j} = \gamma_{t-j}$ and $\delta_{it} = \delta_i$ and assuming the δ_i and the U_{it} are iid normal provides for an estimable model. Heckman offers a heuristic proof of identifiability which relies on the ordering of unconditional probabilities. Suppose $t = 2$ and the Xs are constant over time. Then conditional on X_i and δ_i, in the absence of state dependence, the probability of the sequence (1,0) (one in first period, zero in the second) is equal to the probability of the sequence (0,1). In the presence of state dependence however $P(1,0) < P(0,1)$. State dependence increases the likelihood that persons who experience the event in the first period will experience it again in the second. Therefore P(1,1) is increased and P(1,0) is reduced. P(0,1) on the other hand is unaffected since the event was not experienced in the first period. This relation holds for each individual; it must hold in aggregate. Thus simple run sequences alone allow testing for the presence of state dependence under particular functional form assumptions. Obviously run sequences covering more time periods allow testing of less restrictive functional forms.

Heckman suggests this approach can be usefully applied to a variety of situations, including spells of unemployment. Several features of the Heckman model make its usefulness in this and related situations questionable. For purposes of this discussion, let us divide early job history into only two states -- employed and not employed. The fundamental problem is that the model breaks a continuous time event into artificial periods. When the chosen interval is long relative to average length of stay in a state, there is inevitably an assymetry in the definition of states. Often periods are chosen to be one year long. A person is observationally reported to have been in a particular state for that period if and only if he or she experienced the state at any time during the period. In the current example persons who experience time out of work any time over a year receive 1's, persons who do not receive 0's. Thus to be in a state, one need experience only one week of non-employment, but to be out of the state one need experience 52 weeks of employment. If we simply re-define state 1 as having experienced any employment a very different pattern of states emerges. Virtually everyone is always in state 1. The presence or absence of state dependence may depend on which state is accorded the special privilege of being designated as the 1.

On the other hand, if the periods are short relative to the spells, then state dependence exists almost by assumption. If spells tend to be longer than periods then the probability of being in the state conditional on having been in it in the previous period is high. Indeed, even if spells tend to be four or five times shorter than the periods, one can predict with certainty that at least 20-25% of persons who experience the event one period will experience it again in the next period simply because spells overlap.

The arbitrary designation of time periods and states means an observed data point (1,1) may represent a host of very different histories. One person may have been in the state continuously for two periods. Another may have been in it only a few days but those days happened to overlap two periods. Still a third person might have had several spells in the state in each period. These problems represent more than just lost efficiency. They imply peculiar results. The problem of overlapping spells is particularly troubling in the current treatment. If spells last an average of 13 weeks, then one-fourth of all spells in one year will overlap into another. This implies that even if the spell has no long term effect, P(1,1) is increased. Since the $P(1|1) > P(1|0)$ there appears to be state dependence where there is none. Although these problems are particularly acute in the Heckman formulation using years as periods, they are also present to some degree in the continuous model presented earlier, as we shall see below.

Obviously, the notion of state dependence is a confusing one. In the next few paragraphs I present a non-technical discussion in an attempt to clarify some of the concepts. For a more technical treatment see Ellwood and Summers (in preparation) and Chamberlain (1978) and (1979).

A complete analysis of heterogeneity and state dependence would treat each event in continuous time with a particular starting and ending date. We must separate two distinct types of state dependence. Once a person has entered a particular state -- say employment -- there is a tendency to remain there for some period of time. The probability of remaining in some state is always higher than the probability of entering it from another if the time interval is short enough. Virtually all persons who work one minute will work the next, regardless of their underlying propensity to work over a month, year, or decade. Traditionally this inertia has been captured with a Markov model. Conditional on being in a state, a person has a certain escape probability over a given period of time which may be quite independent of his past history of spells or states.

For example, a young black male teenager who is unemployed this week could be far more likely to be unemployed next week than if he had been employed this week, simply because it is hard for young blacks to find jobs. It could be that nothing about his work history or his length of current unemployment duration influences his ability to get a job; yet being unemployed now indicates that he is less likely to be employed next week. Unemployment doesn't change the individual per se, it is just a difficult state for the teenager to escape. Heterogeneity must imply that each individual has his or her own escape probability from each state. Let us label this form of state dependence simple Markov type persistence. The key notion is that it is what state one is in that counts, not his past history. This persistence is unquestionably present in all human endeavors to some degree.

If the force of escape from one or another state is influenced by previous experience, then the second form of state dependence -- experience dependence -- is present. Exit probabilities may rise or fall with time in the current spell. Work history may influence the likelihood of employment when a teenager is unemployed. Experience dependence corresponds most closely to the conception of state dependence described in the literature. A person is actually "changed" by a particular event. Models which postulate that the accumulation or depreciation of human capital or of information or even of signals of worker quality alters the likelihood of work all imply an altered force of escape from one state or another because of the individual's past experience. Ideally it is this form of state dependence that we seek to capture.

Simple Markov type persistence certainly is not uninteresting. The distribution of forces of escape will strongly influence the concentration of unemployment across individuals. Macro-economic policies can alter escape rates and may provide great benefit to those with otherwise very low rates of escape from unemployment. But if experience dependence is not present, once a spell is over so is its impact.

Unfortunately the current models capture both Markov type persistence and experience dependence simultaneously. Markov persistence requires two heterogeneity parameters: the force of escape from each state. In the Heckman formulation this implies an individual intercept δ_j and an individual coefficient on the person's state last period. This can be modeled (omitting the Xs):

$$Y^*_{it} = \delta_i + \psi_i d_{it-1} + \sum_{j=2}^{k} \gamma_{t-j} di_{t-j} + U_{it}$$

If the time periods are quite short, then δ_i effectively captures the Markov type probability of entering the 1 state; Ψ_i, the probability of remaining in it. With short periods d_{it-1} captures the persons most recent state -- the "current state" while the next state is being determined. Markov persistence virtually guarantees that Ψ_i will be positive as the period shrinks. Experience dependence requires previous job history -- not just the current state alter the probability of entering or remaining in a state. Thus coefficients on d_{it-2}, d_{it-3}... are non-zero. The γ_{t-j} here capture this experience dependence.*

Estimation of this model is complicated by the fact that the δ_i and ψ_i are highly correlated with d_{it-1} and the d_{it-j} since high values of the individual components increase the likelihood that any $d_{ij} = 1$. Estimating the equation assuming $\psi_i = \Psi$ may substantially upward bias the γ_{t-j} coefficients because the omitted term $(\psi_i - \Psi d_{it-1}$ is positively correlated the d_{it-j}. Previous work using this model have over-estimated experience dependence for two reasons. First, the coefficient on the once lagged d_{it} inevitably reflects not only experience dependence but also Markov persistence. Second, because the coefficient on d_{it-1} is constrained to equality across individuals, the γ_{t-j} also capture some Markov type persistence. Heterogeneity has simply not been properly controlled for.

---

* Actually ψ captures both the experience dependence from period t-1 plus the Markov type probability of remaining in state 1. This is of no serious concern if the periods are short. If periods are long, asymmetric definition of periods implies a serious loss of efficiency.

The continuous model described at the beginning of this section also inadvertently captures some Markov type persistence in the state dependence parameter. Suppose weeks worked is the dependent variable. Then it is tempting to regard δ_i as the expected weeks worked in year t given an individual's two escape probabilities. However, even in the presence of Markov persistence alone, the individual's expected weeks worked will be greater if he begins the period working than if he enters without work. Last year's weeks worked helps predict the person's state at the end of that year and therefore at the start of the current year. Anyone who worked 52 weeks in year t-1 was working at the start of year t. He will certainly be expected to have more weeks worked in year t than an identical individual who begins year t out of work. Even conditional on δ_i, weeks worked in one year is correlated with weeks worked in the next because they help predict the person's state at the start of the next period. The correct model is thus:

$$Y_{it} = \delta_i + \psi_i b_{it} + \gamma Y_{it-1} + U_{it} .$$

Where b_{it} is now a dummy variable capturing the person's state at the beginning of year t. In this model δ_i and ψ_i are reflective of the two Markov escape probabilities and γ is a measure of true experience dependence. Even if we know δ_i with certainty, we could not estimate this equation because ψ_i varies with each individual and is highly correlated with b_{it} and Y_{it-1}.

When we difference, however, the advantages of this continuous formulation become clearer:

$$Y_{it} - Y_{it-1} = \psi_i(b_{it} - b_{it-1}) + \gamma(Y_{it-1} - Y_{it-2}) + U_{it} - U_{it-1} .$$

There is only a bias problem for persons who change their beginning state from one period to the next. Otherwise $(b_{it} - b_{it-1}) = 0$ and ψ_i vanishes. One cannot estimate the equation for these persons only because b_{it} is correlated with U_{it-1} and conditioning on it will introduce bias.* But in the present sample, nearly 90% of all persons are observed in the same state at the start of any two consecutive years, so the bias on γ may be quite small.

Including $d_{it} - d_{it-1}$ (instrumenting it with d_{it-1}) will reduce the bias, but will not fully eliminate it. Actually γ does not fully capture experience dependence because δ_i and ψ_i are average yearly probabilities which will in part reflect some experience dependence if the underlying forces of escape are high. It seems quite reasonable then to regard γ as a rough measure of experience dependence. Any better measures require complete work histories and present serious methodological problems. (See Ellwood and Summers.)

In this continuous model, identification was achieved with the imposition of three important restrictions: $\delta_{it} = \delta_i$, $\psi_{it} = \psi_i$ and $Cov(U_{it}, U_{it-1}) = 0$. If any of these restrictions are false, spurious state dependence can be generated. Probably the most serious concern for this group is non-stationarity of the individual components δ_i and ψ_i. If weeks worked is the endogenous variable, δ_i and ψ_i might be seen as that part of maturity, ability, or labor force attachment not captured by the Xs. Since these may grow or decay over time, it seems desirable to free up the individual components. Although we cannot let the components decay or grow at different rates, a model allowing $\delta_{it} = \lambda_t \delta_i$ and $\psi_{it} = \lambda_t \psi_i$ can be estimated using four years of data. We solve for δ_i in the third year equations and substitute it into the fourth.

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* Actually it can be proven that if we assume complete stationarity (exclude all Xs), we can legitimately test the null hypothesis of no state dependence by conditioning on $d_{it-1} = d_{it} = d_{it+1}$.

$$Y_{i3} = \lambda_3 \delta_i + \lambda_3 \psi_i b_{i3} + \gamma_3 Y_{i2} + X_{i3}\beta_3 + U_{i3}$$

So

$$\delta_i = -\psi_i b_{i3} + \frac{1}{\lambda_3} (Y_{i3} - \gamma_3 Y_{i2} - X_{i3}\beta_3 - U_{i3})$$

Substituting into the equation for Y_{i4}

$$Y_{i4} = \lambda_4 \psi_i (b_{i4} - b_{i3}) + (\gamma_4 + \frac{\lambda_4}{\lambda_3}) Y_{i3} - \frac{\lambda_4}{\lambda_3} \gamma_3 Y_{i2} +$$

$$X_{i4}\beta_4 - \frac{\lambda_4}{\lambda_3} X_{i3}\beta_3 + U_{i4} - \frac{\lambda_4}{\lambda_3} U_{i3}$$

The effects of the first term have been discussed earlier. The only other problem is that Y_{i3} is correlated with the error term; Y_{i1} is not however, and serves as a natural instrument for Y_{i3}. If we constrain $\gamma_4 = \gamma_3$ we can obtain estimates of γ and $\frac{\lambda_4}{\lambda_3}$ although we cannot tell which is which.

The restriction Cov(U_{it}, U_{it-1}) = 0 helps to highlight an important distinction between state dependence and serial correlation. In the absence of strong X's which change over time, there is no meaningful distinction between serial correlation and state dependence. However, in the presence of X's the distinction is important. State dependence implies that a change in X will cause a change in Y not only in the present period but in future periods as well, because the initial increase om Y induces future increases in Y. If serial correlation is present, a change in X will have its full force immediately, with no damped response into the future. In the case of unemployment, one might ask whether a weak labor market now induces more unemployment in the future even when the labor market regains its strength. If the answer is yes, then state dependence is present. Otherwise, state dependence probably is not present. Unfortunately, it is likely to be virtually impossible to capture both serial correlation and a non-stationarity of individual specific constant. The only reasonable approach I can see is to assume that both serial correlation and non-stationarity are captured using a time specific coefficient on the individual effect. These models then were used to estimate the long run effects of unemployment.

Empirical Results

Before performing the more complicated tests for state dependence described above, we might try to find "natural experiments" which would reveal it much more simply. Local unemployment rates vary dramatically over time and across locales. One natural experiment would be to test whether persons who enter a weak labor market which later turns strong, fare less well than those who enter a strong market which remains strong. A unique feature of the "Parnes data" is the availability of an area unemployment rate for most persons in each year. The rate for small local areas about the size of an SMSA was derived from a 12 month average of monthly local unemployment rates from the Current Population Survey. Presumably the area unemployment is only slightly correlated with individual effects, so with a few controls for individual characteristics, we might simply test the importance of lagged unemployment rate in equations with both current and lagged unemployment rates. If entering a weak labor market left long term scars, then the lagged rate should be negative and significant. Unfortunately the area rate behaved very poorly. Even in equations without the lagged rate, the coefficient on the current rate, though usually of the correct sign, was rarely significant and was highly unstable. When the lagged rate was included, the results were invariably insignificant and occasionally even the sign on the current rate was perverse.

Even though the area rates performed poorly on this data, this experiment definitely ought to be performed on other samples if possible. Ultimately a conclusion resting on such a sample methodology would be the most compelling test for the long-run effects of short-run macro policy.

The techniques described in the previous section were applied to weeks worked and to weeks unemployed. Weeks worked was chosen over weeks not worked only because it seems conceptually easier to deal with. Obviously since weeks not worked is simply 52 less weeks worked the results would be identical except for the constant term and a sign change on the coefficients of the exogenous variables if the alternative variable was used. There were 298 observations in the final sample.

There is a purely statistical problem associated with the use of the various controls for heterogeneity in equations predicting weeks worked or weeks unemployed. Both are limited dependent variables; they cannot exceed 52 nor fall below zero. The importance of the problem is most evident in the case of weeks worked. As weeks worked approach 52 the estimate of state dependence will approach zero if controls are made for heterogeneity. Statistically the limited variable will induce an artificially negative correlation between once lagged weeks and the error term. The result follows from the fact that if lagged weeks are large the positive end of the distribution of the error term is likely to be truncated. Intuitively once weeks worked approaches 52, regardless of the true strength of state dependence, the next years' weeks cannot be pushed above 52. This problem is of greater concern in later years when more and more of the young men approach 52 weeks employment. There are well known methodologies to correct truncated dependent variables. These typically do not apply to situations where a lagged dependent variable is correlated with the error term for reasons other than truncation. Heterogeneity further complicates the problem. No attempt was made to develop the appropriate truncation corrections for these equations. It should be remembered that persons who remain at 52 weeks in all three years do not bias the results, they simply provide no information because $y_{it} - y_{it} = 0$.

The wage rate normally appears in labor supply equations. At the same time human capital theory suggests that work experience will be associated with higher wages as individuals invest in on the job training. To prevent the wage variable from capturing any effects of increased investment, the variable LW_{it} reflects the wage at the beginning of period t while WW_t equals weeks worked during year t. To eliminate potential bias, the various equations (because weeks worked in year t-1 and therefore U_{t-1} alters the wage in year t) the wage variables were always instrumented with LW_{it-1} and LW_{it-2} in equations controlling for heterogeneity. All strictly exogenous variables are measured at the beginning of each period.

Table 7 presents the results of regressions of weeks worked and weeks unemployed on the once lagged counterparts. The only correction for heterogeneity is the inclusion of a few personal characteristics like age, race, and level of schooling. As anticipated, lagged values of weeks worked and weeks unemployed have sizeable coefficients and small standard errors. As in previous examples in this paper the results for weeks worked are far more stable than those for weeks unemployed.

When all years are estimated as a system and the coefficient on lagged weeks unemployed is constrained to equality over all three years, the coefficient is .27; the coefficient on weeks worked, .39. The results again suggest substantial perisitence of early experience. Still, even

Table 5

Definitions of Variables Used in Regressions

AGE_t - Age at start of year t.

AREA_t - Area unemployment rate at start of year t

BLACK - Race dummy (1 = non-white)

EM_t - Employment dummy (1 = employed) at start of year t

LW_t - Log of wage at start of year t

MAR_t - Marriage dummy (1 = married) at start of year t

SCHOOL - Years of school completed

SMSA_t - SMSA dummy (1 = resides in SMSA) at start of year t

SOUTH_t - South dummy (1 = resides in South) at start of year t

UN_t - Unemployment dummy (1 = unemployed) at start of year t

WW_t - Weeks worked in year t

WUN_t - Weeks unemployed in year t

Dxxxx - Change in variable xxxx

Table 6

Means & Standard Deviations for Variables Used in Regressions

	MEAN	S.D.
AGE 2	18.8	1.98
AREA 2	4.33	1.72
AREA 3	4.22	1.85
AREA 4	4.59	1.93
BLACK	.383	.487
EM 2	.899	.301
EM 3	.932	.251
EM 4	.946	.225
LW 2	.673	.491
LW 3	.826	.442
LW 4	.947	.433
MAR 2	.292	.455
MAR 3	.446	.498
MAR 4	.507	.500
SCHOOL	11.2	1.51
SMSA 2	.634	.482
SMSA 3	.664	.473
SMSA 4	.668	.472
SOUTH 2	.446	.497
SOUTH 3	.432	.496
SOUTH 4	.422	.495
UN 2	.060	.238
UN 3	.050	.219
UN 4	.037	.189
WW 1	43.4	12.77
WW 2	45.2	11.45
WW 3	47.1	9.78
WW 4	47.2	10.64
WUN 1	2.53	6.28
WUN 2	2.88	7.27
WUN 3	2.33	6.33
WUN 4	2.41	7.44

Table 7

Regressions of Weeks Worked and Weeks Unemployed on Once Lagged Values

	DEPENDENT VARIABLES					
	Weeks Worked			Weeks Unemployed		
	WW_4 (t=4)	WW_3 (t=3)	WW_2 (t=2)	WUN_4 (t=4)	WUN_3 (t=3)	WUN_2 (t=2)
BLACK	-.442	.596	-1.54	.370	.328	1.25
	(1.31)	(1.16)	(1.40)	(.945)	(.847)	(.961)
SCHOOL	.348	.239	.541	-.364	-.497	-.073
	(.431)	(.384)	(.450)	(.310)	(.278)	(.306)
AGE_2	.140	.048	.442	-.154	-.369	.005
	(.326)	(.293)	(.355)	(.235)	(.211)	(.242)
$SMSA_t$	-2.55	-1.78	.910	.824	-.331	1.08
	(1.33)	(1.19)	(1.37)	(.943)	(.867)	(.932)
$SOUTH_t$	-.082	.298	3.48	-.768	-1.01	-2.23
	(1.38)	(1.26)	(2.33)	(1.00)	(.914)	(1.03)
MAR_t	2.94	.667	1.45	-1.25	-1.11	-1.36
	(1.22)	(1.09)	(1.43)	(.875)	(.789)	(.967)
$AREA_t$	.193	-.236	-.464	-.148	.042	.356
	(.308)	(.291)	(.372)	(.222)	(.211)	(.255)
LW_t	.686	2.54	1.31	-.741	1.00	-1.18
	(1.64)	(1.54)	(1.49)	(1.16)	(1.12)	(1.01)
WW_{t-1}	.378	.399	.354	--	--	--
	(.062)	(.046)	(.049)			
WUN_{t-1}	--	--	--	.359	.163	.300
				(.067)	(.051)	(.065)
SEE	9.54	8.44	10.1	6.87	6.12	6.89
R^2	.23	.28	.25	.18	.10	.13

without controlling for heterogeneity, the coefficient on weeks unemployed is low. Even if this were the correct estimate of state dependence, a 26 week spell of unemployment would induce less just two extra weeks of unemployment two years later. An equal spell without work would induce a four week spell two years later according to these results. With appropriate corrections for heterogeneity, state dependence estimates should fall to even lower levels.

One control for heterogeneity is differencing. This eliminates any stationary person effects. The second is to include the state at the beginning of each period. Difference equation results are displayed on Tables 8 and 9. In equations (1) and (2), twice lagged weeks unemployed and weeks employed, and once lagged lag wage and beginning state dummies, serve as the principle instruments to the lagged differences on weeks unemployed, weeks worked, lag wage, and beginning states respectively. The equations also include changes in residence, marital status, and area unemployment rate. The personal characteristic variables remain to capture any systematic changes in the dependent variables.

Efficiency can be gained, however, with the use of three stage least squares because both error terms contain the residuals from the third year. Equations (3) and (4) are the unconstrained three stage least squares results. For these equations weeks worked and weeks unemployed in the first year were used as the primary instruments. Finally, in equation (5) the coefficients on all variables shown were constrained to equality across the two years.

Table 8

Difference Equation Results for Weeks Unemployed

	METHOD AND DEPENDENT VARIABLE				
	IV*		3SLS**		Constrained 3SLS**
VARIABLE	(1) $DWUN_4$	(2) $DWUN_3$	(3) $DWUN_4$	(4) $DWUN_3$	(5) $DWUN_4$, $DWUN_3$
$DSMSA_t$	-4.51 (1.78)	0.28 (1.94)	-4.41 (1.88)	0.48 (1.94)	-1.89 (1.29)
$DSOUTH_t$	-2.75 (4.99)	2.18 (4.61)	-2.89 (4.91)	2.07 (4.59)	-0.26 (3.32)
$DMAR_t$	-0.43 (1.57)	1.30 (1.24)	-0.78 (1.65)	1.33 (1.24)	0.69 (0.97)
$DAREA_t$	-0.68 (0.36)	0.06 (0.46)	-0.64 (0.38)	0.07 (0.46)	-0.35 (0.28)
DLW_t	7.34 (3.07)	1.12 (2.20)	7.24 (5.15)	0.51 (1.99)	1.15 (1.77)
DUN_t	2.06 (2.67)	-2.45 (2.20)	-2.21 (6.99)	-2.14 (2.20)	-1.39 (2.04)
$DWUN_{t-1}$	-0.05 (0.07)	-0.002 (0.102)	-0.09 (0.07)	0.001 (0.10)	-0.04 (0.09)

Standard errors in parentheses.

All equations include year dummies, AGE2, BLACK, and SCHOOL.

* Instruments include all past and future values of WW_{t-2}, WUN_{t-2}.

** Instruments include all past and future values of SMSA, SOUTH, MAR, AREA, WW_1, WUN_1.

Table 9

Difference Equation Results for Weeks Worked

	METHOD AND DEPENDENT VARIABLE				
	IV*		3SLS**		Constrained 3SLS**
VARIABLE	(1) DWW_4	(2) DWW_3	(3) DWW_4	(4) DWW_3	(5) DWW_4, DWW_3
$DSMSA_t$	4.36 (2.66)	4.54 (2.60)	5.61 (2.75)	3.77 (2.58)	3.97 (1.79)
$DSOUTH_t$	13.75 (7.50)	1.64 (6.17)	15.57 (7.18)	1.75 (6.10)	7.31 (4.56)
$DMAR_t$	-0.69 (2.36)	-1.75 (1.68)	0.76 (2.40)	-1.59 (1.67)	-1.22 (1.35)
$DAREA_t$	-0.47 (0.53)	-0.12 (0.62)	0.48 (0.54)	-0.12 (0.62)	0.25 (0.39)
DLW_t	1.06 (4.54)	-1.98 (2.68)	-3.14 (7.72)	-1.06 (2.65)	-0.54 (2.39)
DEM_t	3.54 (3.18)	4.92 (2.40)	3.75 (7.35)	5.34 (2.39)	4.63 (2.22)
DWW_{t-1}	0.19 (0.10)	0.12 (0.08)	0.08 (0.25)	0.14 (0.08)	0.13 (0.07)

Standard errors in parentheses.

All equations include year dummies, AGE2, BLACK, and SCHOOL.

* Instruments include all past and future values of SMSA, SOUTH, MAR, AREA, WW_{t-2}, WUN_{t-2}, LW_{t-1}, EM_{t-1}.

** Instruments include all past and future values of SMSA, SOUTH, MAR, AREA, WW_1, WUN_1, LW_2, EM_2.

The results in the unemployment equations are quite striking. All evidence of state dependence is eliminated. The coefficients on the lagged change in weeks unemployed is rarely positive and never significant. Indeed, there is even a hint in the results of negative state dependence. Persons with unusually high unemployment one year will have unusually low unemployment the next. Note also the poor performance of the change in beginning state dummies, DUN_t. The standard errors are always quite high and in four of five cases the sign is incorrect. Very few persons change states so DUN_t is virtually always zero and the variable is always instrumented. These facts no doubt explain a large part of the perverse results. Nonetheless there appears to be relatively little Markov persistence in unemployment not captured by δ_i. Even without controlling for non-stationarity or serial correlation then, persistence of unemployment -- as distinguished from non-employment -- can be entirely attributed to heterogeneity not state dependence.

The results for weeks worked are quite different. Although corrections for heterogeneity substantially reduce the coefficient on the lagged dependent variable, some experience dependence remains. The experience dependence parameter varies from .08 to .19 across years and specifications. In the constrained 3SLS equation its value is .13 and is nearly twice its standard error in spite of being instrumented. This coefficient indicates that persons who work an extra 30 weeks one year will work an additional 4 during the next as a direct result of this extra employment.

There is also strong evidence for the presence of Markov persistence. On average, persons who are working at the beginning of a year are expected to work an additional 5 weeks more in that year than if they had been out of work. Excluding this parameter does upward bias the experience dependence parameter. In the constrained 3SLS equation with this omitted, the dependence parameter is 0.21.

In sharp contrast to the results for unemployment then, controls for heterogeneity do not eliminate the experience dependence estimate and the beginning state variable performs well. This is perhaps the most conclusive evidence that the retrospective unemployment rates have little meaning. Unemployment as measured here does not beget unemployment. Non-employment begets non-employment. Or, even more convincingly, employment begets employment. The results suggest real gains from work.

One disappointment in the results is the poor showing of the exogenous variables. Most were insignificant in the constrained three stage equations. The SMSA, SOUTH and MAR variables were not expected to perform well as few persons moved or got married. But the performance of the area variable was unanticipated. Its sign was often incorrect; its magnitude was usually low; and its standard error was always high. The lack of strong exogenous variables prevents certain isolation of serial correlation and state dependence. Corrections for more stationarity, however, should capture much of the effects of serial correlation.

A second surprise was the very weak performance of the wage in all equations and specifications. Even in the equations which don't control for heterogeneity (Table 7) the coefficients on LW_t are quite small and never significant. At most a 10% increase in wage increases weeks worked by a trifling 2 days! In the difference equations, the standard errors are inevitably quite high and most signs are incorrect. Using the change in wage rather than the absolute level does little to improve the performance of this measure. Although perplexing, these results are strongly verified in the next section. Measured wage of course may be quite different from potential wage if the youngster is investing in on-the-job training.

Non-stationarity might be a source of serious bias in the results. Sharply changing employment rates resulting from rising or decaying heterogeneity unrelated to employment could be spuriously picked up as experience dependence. Including age, race, marital status, and an intercept in the difference equations captures systematic changes and helps to minimize the problem. Corrections for non-stationarity requires four years of data. Thus non-stationarity can only be tested between the third and fourth year.

Table 10 presents the results for weeks unemployed and weeks worked designed to isolate the effects of non-stationarity and state dependence. Once again the unemployment equation behaves badly, WUN_3 failing even to change sign. The weeks worked equation, however, performs surprisingly well. Although the standard error in the twice lagged weeks worked is large, so too is its magnitude. The coefficients imply a non-stationarity parameter (ratio of the individual effects in year three and four) of 0.76 and a state dependence parameter of 0.11. (Although the specification allows either parameter to be 0.76 or 0.11, it is clear from context which is which.) The heterogeneity parameter does show some decay (capturing some serial correlation no doubt), but the experience dependence parameter is nearly identical to that derived in the constrained 3SLS specification.

Table 10

Instrumental Variable Equations Allowing Non-Stationarity of Individual Component

	DEPENDENT VARIABLE	
	WW 4	WUN 4
SMSA 4	4.42 (2.71)	-4.03 (2.08)
SMSA 3	-5.67 (2.59)	4.70 (1.99)
SOUTH 4	15.37 (6.65)	-3.92 (4.96)
SOUTH 3	-16.97 (6.84)	4.47 (3.10)
MAR 4	2.01 (2.42)	-2.76 (1.75)
MAR 3	1.23 (2.29)	0.25 (1.66)
AREA 4	0.30 (0.50)	0.04 (0.39)
AREA 3	0.31 (0.54)	0.08 (0.39)
LW 4	-7.13 (6.67)	11.96 (5.23)
LW 3	1.65 (4.34)	-7.08 (3.45)
DEM 4	3.64 (3.01)	--
WW 3	0.87 (0.19)	--
WW 2	-0.084 (0.098)	--
DUN 4	--	-0.04 (3.03)
WUN 3	--	0.43 (0.20)
WUN 2	--	0.081 (0.072)
SEE	10.5	7.84

Equations also include BLACK, SCHOOL, AGE 2.

Instruments include SMSA 4, SMSA 3, SOUTH 4, SOUTH 3, MAR 4, MAR 3, AREA 4, AREA 3, BLACK, SCHOOL, AGE_2, WW_2, WW_1, WUN_2, WUN_1, LW_3, LW_2, EM_3, EM_2, UN_3, UN_2.

This analysis illustrates the critical importance of controlling for heterogeneity. Controls eliminated all of the apparent state dependence in unemployment equations. They reduced by two-thirds the dependence parameter in the weeks worked equations. Previous studies which used only additional demographic variables to control for heterogeneity have seriously overstated the true long-term impact of teenage unemployment on future labor market practice.

The conclusion then is that working does have some benefit beyond the current year. Someone working an extra 30 weeks this year will perhaps work an extra 4 in the next. This result does not distinguish between voluntary and involuntary time out of work. Work may improve skills, open new options for employment, or simply increase work attachment.

Nonetheless, in absolute terms the long-run impact is relatively small. Even 30 weeks out of work has virtually no impact after one or two years. For this group of youngsters there is no evidence of a long-term cycle of recurring periods without employment induced by an early episode out of work. Experience dependence yes, but a serious "permanent scar" no.

These estimates are not perfect. There are potential biases in both directions. Nevertheless, I find the evidence that teenage non-employment exhibits short-term state dependence quite compelling. There are, however, three important caveats. First, this evidence is from a group of teenagers who entered the labor force in extremely favorable times. In this period it may have been the case that jobs were readily available for most youngsters. The seventies has brought a substantially worse job outlook. In this environment the effects of employment and the lack of it may be very different. Second, this is not a random sample of young persons. Some of the long term non-employed may have been excluded from the sample. These persons may gain and lose more from being in or out or work. Finally, the sample here is too small to separate effects on specific groups. It may be that one can isolate stronger effects among blacks, or low income persons.

These concerns notwithstanding, the current evidence is clear. Teenage non-employment has real but short lived adverse effects on teenage employment prospects.

III. THE IMPACT OF WORK EXPERIENCE ON WAGES

The second potential cost of being out of work is that the lost experience will translate into reduced wages. In the long run, reduced wages could be a far more important cost of unemployment. Lost experience could travel with the worker over his life. Each job may serve as a stepping stone to another. Lost experience at least delays the start of the young worker's climb. Worse, it may track the worker into a less desirable chain of jobs. This final section attempts to separate the cost of lost experience from differences in individual earning capacity correlated with work experience.

Assessing the true impact of work experience in a particular year apart from heterogeneity is a very compl[illegible] problem. The triangular structure of wages whereby work experience influences wages which in turn influences future work experience, in combination with the direct experience dependence of work experience creates a hopelessly tangled collection of heterogeneity terms with coefficients which vary over time.

The problems can best be understood by starting with a multi-equation system. Let LW_{it} be the natural log of wages if individual i at the start of year t, X_{it} a vector of exogenous variables, and WW_{it} be weeks worked in year t. One model of wages and employment is:

$$(1) \quad LW_{it} = X_{it}\beta_t + \sum_{j=1}^{t-1} \alpha_{tt-j} WW_{it-j} + \lambda_{it} + \varepsilon_{it}$$

$$(2) \quad WW_{it} = X_{it}\beta_t + \gamma_t WW_{it-1} + W_t LW_{it} + \delta_{it} + \Psi_{it} b_{it} + U_{it}$$

Here equation (1) is just a straightforward human capital type wage equation; equation (2) is just the labor supply relation from the previous section. λ_{it} is a heterogeneity term in the wage equation, δ_{it} and Ψ_{it} are the individual components in the weeks worked model. Note that α_{tt-j} is almost certainly not going to be constant across weeks worked in different years since the flattening profile suggests diminished investment over time.

Only lagged weeks worked appear in the wage equation. Thus the system is triangular and a reduced form equation can be derived in a straight-forward fashion. If we assume $\lambda_{it} = \lambda_i$, $\delta_{it} = \delta_i$, and $\Psi_{it} = \Psi_i$ and if we condition on WW_{i1}, the reduced form equation will have the following form.

$$LW_{it} = \sum_{j=2}^{t} X_{ij}A_j + B_t WW_{i1} + C_t\delta_i + \sum_{j=2}^{t} D_t\Psi_i d_{it} + E_t\lambda_i + \sum_{j=2}^{t} F_t U_{it} + \sum_{j=2}^{t} G_t \varepsilon_{it}$$

The coefficient on WW_{i1} in the correctly estimated reduced form equation captures the full impact of early unemployment on the wage in year t. Previous authors have estimated equations of this type in the past but have included few controls for heterogeneity or Markov persistence.

The reduced form equation helps point out the dual biases present in OLS estimation of this equation. Early experience may be correlated with the individual component in wages, λ_i, ("ability"), upward biasing the coefficient on WW_{i1}. This bias grows over time because λ_i affects wages each year which alters future weeks worked which in turn influences future wages. At the same time, early experience is correlated with later experience in part because of the individual components of experience, δ_i, Ψ_i, ("work attachment" and "case of finding a job"). Since experience yields positive benefits, the coefficient on WW_{i1} is further biased because early experience inappropriately captures some of the effects of later experience. This effect also grows over time,

each year brings new experience correlated with first year's experience. (In practice, of course, most workers eventually hit roughly 52 weeks employment each year so the correlation is not perpetual.) Thus, previous estimates of the long-term impacts of early employment experience may be severely biased. One other feature of the equation should be noted. The equation includes all X's between year 2 and year t. Exclusion of these is yet another source of potential bias.

Yet even this rather complicated model leaves much to be desired. Human capital theories suggest persons may select different shaped profiles. Persons with early unemployment and non-employment may have flatter schedules. Blue-collar workers have slower wage growth than their white-collar counterparts. If the return to experience is systematically lower for persons lacking some early work experience, the coefficient will be further biased upward. Similarly, the individual components may not be stationary over time, introducing even more bias.

Even ignoring the inadequacies with the current model, however, it is virtually impossible to get consistent estimates of the coefficient on weeks worked in the first year. Simple differencing does not eliminate the heterogeneity components since the coefficients on all are changing over time. Equally troubling, WW_{i1} is fixed over time. Differencing yields only the change in its coefficient, not its overall magnitude. The only hope for estimation is to find an instrument correlated with WW_{i1} but partially uncorrelated with δ_i, Ψ_i, or λ_i. One such instrument might be the area unemployment rate in year 1. It is not currently in the equations and the inclusion of race and residence dummies along with schooling may eliminate most of its correlation with the individual effects. Unfortunately, we have already seen that the area rate performed poorly in weeks worked equations. Thus it is an unlikely instrument.

Although isolation of the full long-term impact of non-employment in this data set is infeasible then, a more modest attempt can be made to isolate the impact of heterogeneity. Let us concentrate solely on equation (1), the regression of log wages in an individual constant and weeks worked in previous years. If we treat weeks worked in each year as exogenous, then simple differencing eliminates the nuisance parameter and leaves the last weeks worked parameter intact. Thus,

$$(1) \quad LW_{it} = X_{it}\beta'_t + \sum_{j=1}^{t-1} \alpha_{ti-j} WW_{it-j} + \lambda_i + U_{it}$$

$$(1') \quad LW_{it} - LW_{it-1} = X_{it}\beta'_t - X_{it-1}\beta'_{t-1} + \sum_{j=2}^{t-7} (\alpha_{ti-j} - \alpha_{t-1t-j})\, WW_{it-j} +$$

$$\alpha_{tt-1}\, WW_{it-1} + U_{it} - U_{it-1}$$

As long as the weeks worked are strictly exogenous, α_{tt-1}, the coefficient on the weeks worked in year t-1 represents its impact in that year. One can also difference wages separated by two years. In that case, the coefficients on the last two years of experience could be captured.

The exogeneity assumption however is highly suspect. Even if we assume that WW_{t-1} was uncorrelated with U_{it}, the presence of LW_{t-1} in the labor supply equation determining WW_{t-1} guarantees that $Cov(WW_{t-1}, U_{it-1}) > 0$. OLS estimates of the difference equation will then understate the true impact of WW_t on wages. In the previous labor supply results the coefficient on LW_{t-1} was often small, occasionally of wrong sign and invariably insignificant. Still, without stronger evidence of exogeneity, we must be concerned that OLS estimates will be biased.

There are two reasonable approaches to this problem. First Sims (1972) has suggested a very simple methodology to test for exogeneity -- simply regress the dependent variable on all past and future values of the independent variable. Strict exogeneity in the absence of heterogeneity implies that the coefficient on future values will be zero; those on past values, non-zero. If causality is uni-directional, past values of the independent variable will influence the dependent variable, but the current dependent variable will not influence future values of the independent variables. Unfortunately, even if the independent variable is strictly exogenous, in the presence of heterogeneity the expectation of the future coefficients will be non-zero if the future values are correlated with any part of the heterogeneity not captured by other variables in the equation. See Chamberlain (1979).

The common sense notion is that any variable partially correlated with an omitted stationary heterogeneity term will have a non-zero coefficient even in equations where the variable would otherwise have a zero coefficient, because it will be serving as a proxy for the omitted variable. If weeks worked in year 2 is capturing heterogeneity in the year 2 wage equation, it ought to capture the same heterogeneity in year 1. Essentially, Sim's is a test for true causality as opposed to spurious correlation due to endogeneity or omitted variables.

If, as seems likely, the Sim's test fails, we are forced to seek an instrument for WW_{it-1} in equation (1'). If we assume that impact work experience in some year j raises wages in years t-1 and t by a equal amount, $\alpha_{tj} = \alpha_{t-1j}$ and we can withdraw WW_{ij} from the equation and use it to instrument WW_{it}. WW_{it-2} for instance, might serve as an effective instrument.

Many authors have previously sought to remove heterogeneity or "ability" bias from wage equations. (See for example Chamberlain 1978a, Griliches and Mason 1972). These efforts typically were not aimed at deriving the coefficient on work experience as distinct from age, nor did they focus particularly on the very early years of experience. Nonetheless it would be surprising in light of all the previous efforts if we did not find a substantial effect of work experience on wages.

Empirical Results in Wage Equations

To roughly replicate previous studies of the effects of unemployment on wages, wage equations were first estimated for 1975 and 1973 with no experience variables included other than weeks worked in the first year. The data base was the same sample of young men who left high school in 1965 to 1967. The results were similar to those reported by other authors. The coefficient on WW_1 was .00452 on 1975 and .00478 in 1973. Both coefficients were quite significant. If the values actually reflected the time effect of early non-employment on future wages, the impact is staggering. Youngsters missing out on 26 weeks employment experience in their first year out of school are left with 12 percent lower wages even ten years later! Cumulated over a lifetime, the cost could be enormous. These results are not purged of heterogeneity, of course. The large size of the possible losses thus makes the separation of the true impact quite important.

At the very least, the results do show dramatic persistence in wages for persons with early time not employed. Even if non-employment had no important impact of its own, early unemployment can be used to single out persons who will do poorly in the future. They could be the recipients of special aid. The result is also important because it suggests early experience could be used as a signal of "quality" or "ability" by employers. This is not to say that employers in 1975 look at what happened in 1966, but employers in 1967 or 1968 could. And employers in the next year can look back to 1968 and so forth. In a market with great uncertainty, those persons who genuinely tried but failed to get work may be inadvertently classed as poor workers. It may take these workers some real time to recover from this early adverse signal.

The issue at hand, however, is whether this early experience or lack thereof actually has ill effects. The previous section described why the only possible hope of capturing the very long-term effects was with an effective instrument on WW_1. The area unemployment rate in year 1 was suggested. As expected, however, instrumental variable equations behaved poorly. The results were erratic; standard errors, very high. Thus, I chose to focus more narrowly on the effects of experience in the first four years of experience.

Table 11 presents regression results of wages at the end of each of the first four full years out of school as a function of weeks worked in previous years. These were estimated as seemingly unrelated equations since the error terms will almost certainly be correlated. With only 271 observations, the results are plagued by rather high standard errors. Nonetheless the coefficients on past weeks worked are quite sizeable. Furthermore, the results seem quite stable until year 4 when collinearity seems to be excessive. The numbers suggest that each year of experience is associated with a 10-20 percent wage increase in these first four years. Although reserving some concern for the low significance of some estimates, I shall concentrate on determining whether the high point estimates appear to be the result of heterogeneity or state dependence.

The Sims test for true causality is to include future work experience in current wage equations. Strict exogeneity implies zero coefficients on future variables so that the coefficients on WW_2, WW_3, and WW_4 would be zero in the LW_2 regression; WW_3 and WW_4, in the LW_3 regression, and so forth. (Recall that LW_t is wage at the

TABLE 11 : Wage Equations for the First Four Years Out of School

	- Dependent Variables -			
	$LWAGE_2$ (t = 2)	$LWAGE_3$ (t = 3)	$LWAGE_4$ (t = 4)	$LWAGE_5$ (t = 5)
SCHOOL	.040 (.017)	.051 (.014)	.046 (.015)	.060 (.014)
AGE_2	.040 (.017)	.038 (.011)	.018 (.012)	.027 (.011)
BLACK	-.114 (.053)	-.125 (.045)	-.124 (.048)	-.070 (.045)
$SMSA_t$	.135 (.048)	.145 (.039)	.171 (.041)	.138 (.038)
$SOUTH_t$	-.275 (.055)	-.218 (.045)	-.197 (.047)	-.264 (.044)
MAR_t	.078 (.046)	.105 (.033)	.078 (.035)	.085 (.034)
$AREA_t$	.010 (.013)	.005 (.009)	-.003 (.008)	-.012 (.007)
WW_1	.0030 (.0019)	.0036 (.0017)	.0034 (.0019)	.0049 (.0017)
WW_2	--	.0028 (.0018)	.0035 (.0021)	.0010 (.0020)
WW_3	--	--	.0043 (.0020)	.0019 (.0022)
WW_4	--	--	--	.0017 (.0017)
INTERCEPT	-.675 (.258)	-.742 (.221)	-.433 (.237)	-.487 (.226)

All equations estimated as seemingly unrelated equations.

beginning of year t or end of year t-1). Table 12 displays wage equations for years 2,3, and 4, when weeks worked in year 1 to 4 are included in each regression. The results are striking. In spite of a high degree of multicollinearity, in each of the equations the coefficients on past experiences remain strongly positive. The coefficients on future experience tend to be small or of incorrect sign. Incredibly neither endogeneity nor heterogeneity may seriously bias the coefficients on WW_2, WW_3 or WW_4. A likelihood ratio test that the coefficients on future values are zero is not rejected. Twice the natural log of the likelihood ratio is 7.7 while the critical value of $\chi^2(6)$ is 12.6. A similar test that the coefficients on past values are zero is overwhelmingly rejected. (Likelihood ratio = 126.3.)

This evidence for the one-way causality of weeks worked on wages is quite surprising, although the very weak performance of the wage variables in the labor supply equation portended this exogeneity. The minimal bias resulting from heterogeneity is perhaps even more remarkable. It should be remembered though, that these results in no way indicate that heterogeneity is absent. They show instead that the portion of heterogeneity correlated with WW_2, WW_3 and WW_4, is fully captured by WW_1, SCHOOL, AGE, and the other controls. The coefficients on these latter variables are undoubtedly biased by the presence of heterogeneity.

The very powerful conclusion from this exercise is that at least in these four years the coefficients are a good reflection of the causal relationship between experience and wages. Not surprisingly the difference results confirm these findings. Differencing elevates any

TABLE 12 : Wage Equations with Weeks Worked in First Four Years Included in All Regressions*

	- Dependent Variables -		
	$LWAGE_2$ (t = 2)	$LWAGE_3$ (t = 3)	$LWAGE_4$ (t = 4)
WW1	.0031 (.0021)	.0036 (.0018)	.0034 (.0019)
WW2	-.0005 (.0026)	.0025 (.0022)	.0032 (.0023)
WW3	.0014 (.0031)	.0014 (.0026)	.0047 (.0028)
WW4	-.0019 (.0026)	-.0015 (.0022)	.0009 (.0024)

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* All equations include SCHOOL, AGE_t, BLACK, $SMSA_t$, $SOUTH_t$, MAR_t, $AREA_t$. All equations estimated as seemingly unrelated equations.

stationary effects correlated with weeks worked. If heterogeneity were a serious problem we should expect the coefficients on work experience accumulated between the differenced years' wages to fall. At the same time, endogeneity would induce a negative correlation between this experience and the error term causing a further fall.

Since the coefficients in year 4 showed that multi-collinearity may be excessive, I will concentrate on the first three years' wage equations. (The results for year four are quite similar.) Table 14 presents the estimated coefficients in three difference equations: In the first column, first year wages are subtracted from those of the second year. The second column presents results of the regressions on the difference in wages between years 2 and 3. The final column provides differences between years 3 and 1. Once again, the data strongly suggest that heterogeneity and endogeneity are relatively small parts of the measured association between experience and wages in the second and third years. The impact of weeks worked in year 1 is neutralized in all of the difference equations as would be predicted, since the coefficient represents the difference in the effects of experience on wages in two future years. The coefficient on weeks worked in the second year is effectively zero in the second equation, again as predicted. However, the coefficients on weeks worked in the second and third years in equations where those effects were not differenced out remain quite large. The coefficients are much more stable across equations than they were in Table 11. Their magnitude is if anything greater and their significance is increased. The results are thus highly supportive of a causal relationship between experience and wages. The

TABLE 13 : Differenced Wage Equations*

	- Dependent Variables -		
	$LWAGE_3 - LWAGE_2$	$LWAGE_4 - LWAGE_3$	$LWAGE_4 - LWAGE_2$
	$(t_1 = 3, t_2 = 2)$	$(t_1 = 4, t_2 = 3)$	$(t_1 = 4, t_2 = 2)$
WW_1	.0002 (.0019)	-.0001 (.0016)	.0002 (.0020)
WW_2	.0035 (.0022)	.0006 (.0020)	.0040 (.0025)
WW_3	--	.0041 (.0021)	.0040 (.0021)

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* All equations include: SCHOOL, AGE_2, BLACK, $SMSA_{t1}$, $SMSA_{t2}$, $SOUTH_{t1}$, $SOUTH_{t2}$, MAR_{t1}, MAR_{t2}, $AREA_{t1}$, $AREA_{t2}$.

All equations estimated as seemingly unrelated equations.

increase in the significance is reassuring that the effects of experience are not purely spurious.

One possible problem may be that we have tested the wrong model. Jobs with the highest wage growth may have very stable employment requirements. This model would imply that if a Sims type test was performed using the change in wages on the left hand side, future weeks worked would enter significantly since workers would presumably remain with their jobs. Note also that past weeks worked would likely enter significantly since there is a good chance that persons with good jobs now, as measured by wage growth, had them in the previous year. Neither result was prominent in the data. Moreover, it is quite possible that the largest single year wage changes will be associated with job changes. Presumably some young men find new jobs offering better pay. The movers probably have fewer weeks worked than the stayers. These persons downward bias the results.

The results presented here strongly suggest that in the very early years, experience increases wages by as much as 10-20 percent per year. The biggest cost of being out of work therefore may well be the lost work experience. These data do not reveal whether this is the result of the accumulation of general or specific human captial or even if they merely reflect signaling. Nor do they reveal what skills might be gained from early experience. They do reveal, however, that lost work experience really can be quite costly.

These data do not allow good tests for a catch-up effect. It is possible that the loss in wages due to previously lost experience is compensated for when the individual finally gets a steady job. Interaction terms simply make the results unstable. This is an important possibility which merits attention in future work.

The results here imply that early experience increases wages by 12-20 percent. I regard these wage equations as preliminary results requiring verification from other sources. Still, they provide surprisingly strong evidence that at least in the short run, work experience really does make a difference. Just how long the effect persists requires other analyses. Ultimately, the final conclusion awaits the availability of a good area unemployment rate measure so that WW_1 can be properly instrumented.

Conclusion: Permanent Scars or Temporary Blemishes?

The first part of this paper examined the early pattern of labor market performance of young men. Several important conclusions arise.

- The early years of labor market experience are times of substantial change. Employment rates rise, as do participation rates. There is considerable evidence of weak labor force attachment early in many young men's careers.

- Although the distinction between time out of the labor force and time unemployed is conceptually appealing, the division is not accurately captured in this retrospective data. Unemployment rates behave erratically over time for this group. All of the results in this paper suggest that time not employed is a far better measure of the labor market performance of young men.

- Even though there is a general improvement in employment rates for these young men over time, early labor market patterns persist. Young men with poor records early will typically have comparatively poor records later.

The next section revealed that much of the persistence in employment patterns could be directly attributed to heterogeneity.

- Controls for heterogeneity eliminates at least two-thirds of the observed persistence in employment, but evidence of experience dependence remains. That is, even controlling for individual differences in the propensity to work, experience dependence remains. However the absolute magnitude of the effect is small. Even a six month spell out of work tends to generate only an additional 3 to 4 weeks out of work one year later. There is no evidence in this data that time out of work sets off a long term cycle of recurring "non-employment."

Finally, the effects of work experience on wages was examined. Apparently, neither heterogeneity nor endogeneity induce important biases in the estimated impact of work experience in the second, third, and fourth years out of school on the wages of youngsters in the first few years afterward. The impact of early experience on wages is quite large.

> - Early work experience has a sizeable impact on wages. Controlling for individual effects, experience in the second, third, or fourth years out of school tends to be associated with wage increases of between 10 and 20 percent a year.

The data did not allow testing for the possibility of catch-up, nor to test how long these wage differentials persist.

There is a strong asymmetry in the problem of isolating the real effects of early labor market experience on future employment and wages from the differences in wages and employment that are the natural result of differences in people within the labor market. There are many reasons to expect unobserved differences in people will be correlated both with employment and wages. Thus a finding suggesting that early experience has real impact is always suspect. On the other hand, a finding of no impact is considered quite convincing since the deck was stacked against such a conclusion. The results in this paper lead me to the former more suspect finding. Early experience really does seem to make a difference, particularly on wages. Even after rather elaborate controls for heterogeneity, both wages and labor supply seem to be directly related to past work experience in the short run, although the effects on labor supply is quite small.

As with all research, many caveats remain. This research was conducted on a small select sample in a period of tight labor markets, quite unlike the present situation. It may be that these findings are peculiar to this group or this era. No separate analysis has been done for the central city poor. The cleanest experiment -- testing whether past unemployment rates predict future wages and employment, could not be performed. The ultimate answer to the question of the long-term impact must await these results. Until such time as high quality local unemployment data are available, we will have to rely on statistical methods of removing heterogeneity.

In this group of young men the heavy cost of time out of work was the impact of the lost work experience on wages. The data does not show whether working generates better work habits, either general or firm specific skills, or even just positive signals. Policy makers should keep in mind, however, that many forms of public employment may not generate the desirable human capital or worker quality signals. Employers may regard public employment quite differently than private employment. The challenge for public policy is to design aid programs which help young people accumulate the important labor experience, rather than simply provide programs which makes the government the employer of last resort.

REFERENCES

Becker, Evans E. and S. Mills,1978 "Teenage Unemployment: Some Evidence of the Long Run Effects" Draft.

Chamberlain, G.,1978 "Omitted Variable Bias in Panel Data: Estimating the Returns to Schooling" Annales de l'INSEE, No. 30-31, April - September 1978.

Chamberlain, G.,1979 "Heterogeniety, Omitted Variable Bias and Duration Dependence" HIER Discussion Paper No. 691.

Clark, K. and L. Summers, 1979 "The Dynamics of Youth Unemployment", NBER Working Paper No. 274.

Ellwood, D. and L. Summers "Markov Persistence vs. Experience Dependence - A Continuous Time Framework in preparation.

Grilliches, Z. and W. Mason, 1972 "Education Income and Ability" Journal of Political Economy Vol. 80, No. 3.

Heckman, J., 1978a "Dummy Endogenous Variables in a Simultaneous Equation System," Econometrica No. 46.

Heckman, J., 1978b "Sample Statistical Models for Discrete Panel Data Developed and Applied to Test the Hypothesis of True State Dependence Against the Hypothesis of Spurious State Dependence" Annales de l'INSEE No. 30-31.

Heckman, J. and Willis, R., 1977 "A Beta-logistic Model for the Analysis of Sequential Labor Force Participation by Married Women," Journal of Political Economy, No. 85.

Lillard, L. and R. Willis, 1977 "Dynamic Aspects of Earning Mobility" NBER Working Paper No. 150 (revised).

Sims, C., 1972 "Money, Income and Casualty" American Economic Review, Vol. 62.

Stevenson, W., 1978 "The Relationship Between Early Work Experience and Future Employability" in Adams, A. and G. Mangum - The Lingering Crisis of Youth Unemployment,Upjohn Institute for Empirical Research.

The Employment and Wage Consequences of Teenage Women's Nonemployment

Mary Corcoran

INTORDUCTION

Teenage unemployment has risen dramatically in the last few years and has become an increasingly visible national problem, causing widespread concern. However, little is known about its causes and consequences. Some argue that being without work in what should be the early years of one's career does permanent harm by typing an individual as an unreliable worker, weakening labor force attachment and depriving him or her of valuable opportunities to invest in work skills. Search theory, on the other hand, suggests that teenage unemployment may be a necessary consequence of the process by which young workers look for the jobs most appropriate to their skills. Others argue that lack of employment in the teenage years is the result either of weak work attachment or (in the case of women) of rational and voluntary decisions to trade off wages and employment for family work.

I propose to examine the ways in which lack of employment as teenagers affects employment and wages of women in later years. I will concentrate on perhaps the most serious problem in capturing the consequences of not working, that of separating the differences in employment and wages which are causally related to teenage nonemployment from the differences which are due to unobserved personal characteristics correlated with it.[1]

Most analyses in this paper do not separate unemployment time from time out of the labor force. This has the advantage of being comparable with Ellwood's analysis (~~Chapter XX in this volume~~). More importantly, while teenage women who are actively seeking work may differ in important ways from those who are not, it is not clear that either retrospective reports of unemployment or the standard CPS unemployment questions allow one to distinguish between these groups. Results reported by Clark and Summers and Ashenfelter (1978) suggest that unemployment statistics fail to capture the labor market activity of young workers adequately, and do not appear to differentiate nonworkers who are seeking work from those who are not. Moreover, unemployment forms a small part of teenage women's reported nonwork time. Understanding how nonwork in the teenage years affects women's later life changes is crucial, whether or not such nonwork is voluntary.

This paper has three sections. First I describe teenage women's work activity in the years following school completion. Next I investigate whether early nonemployment reduces women's chances of later employment once we adjust for individual differences that are stable over time and affect employment. Because of data restrictions, this section concentrates on short-run employment effects. In the last section, I estimate the long-run wages costs associated with early nonwork.

This paper has six conclusions:

1) Young women's early labor market behavior is quite dynamic. Six out of seven women spent some time working and some time out of work in the four years following school completion.
2) In the four years following school completion, young women's employment rates and participation rates dropped, the duration of nonemployment increased, and the probability that a woman did not work at all doubled. This is the reverse of the pattern observed by Ellwood for young men.
3) Early labor market experiences persisted. Young women with poor early records typically had relatively poor records later. Heterogeneity accounted for a great deal of this persistence. The odds that a woman works given she worked last year were 14.8 times higher than if she did not work last year. Adjustments for heterogeneity halve these odds. Thus, even after

controlling for individual differences in women's propensity to work, not working in one year is associated with a much lower probablity of working in the next year.

4) There is also evidence that employment effects persist beyond adjacent years. Even given her current work status, a woman's past work history is significantly related to her future work. Because of data restrictions, I could not estimate the magnitude of this relationship or how soon it dies out.

5) Early nonwork involved considerable opportunity costs--in the form of lower wages. Ten years after school completion, a woman who spent two years out of work in the years following school completion earned three to five percent less per hour than did an otherwise similar woman who had worked continuously since leaving school. Moreover, for white women, the losses associated with nonwork are greater if that nonwork occurs at the beginning of one's career. This finding must be qualified in two ways. First, at least part of the cost of teenage nonemployment may result from individual differences which are correlated with early nonemployment and later wages. However, controls for differences in women's labor force attachment did not reduce the long-run wage costs associated with teenage nonemployment. Second, some women may be voluntarily electing these costs in order to pursue other goals. But whether voluntary or not, a prolonged period of nonemployment early in one's career is associated with considerably lower wages - even 20 years later. This pattern of long-term reductions in earnings potential is consistent with the results for young men reported by Ellwood, and Meyer and Wise.

Nonemployment in womens' teenage years is an important policy issue. A sizeable proportion of young women reported extended periods of nonemployment in the years following school. Whether voluntary or not, this nonemployment had considerable opportunity costs. It was associated with a lower probability of employment in the short run with lower wages throughout a woman's work career. Choices made about work and nonwork in the teenage years were clearly important to women's life chances.

The Consequences of Early Nonwork; Theoretical Predictions

Patterns of teenage labor market activity in the years following school completion are quite dynamic with the majority spending some time unemployed, out-of-the labor force or both. This continual movement in and out of paid work is more striking for women than for men. Also, women's employment rates, unlike those of men, declined rather than grew in the years following school completion.

Opinions about the consequences of early nonwork vary considerably with some claiming that it may seriously harm an individual's long-term economic prospects while others argue either that long-run effects are minor or that both any negative consequences associated with early nonwork and early nonwork itself merely reflect unobserved differences in worker quality or in workers' tastes for work. This latter argument has been applied to women in particular since some argue that many young women voluntarily decide to drop out of the labor force because of a preference for home versus market work. Others argue that such "preferences" may be conditioned or encouraged by sex discrimination, either perceived or actual, combined with a shortage of decent jobs.

Both human capital and crowding theories of women's labor market behavior lead to the conclusion that the long-term effects of an early lack of work may be less serious, on average, for women than for men. Human capital theorists stress the importance of early investments in on-the job-training for men, but argue that a woman's optimal investment strategy may differ (see Mincer and

Polachek, 1974). Underlying this argument are two assumptions. The first is that many women will choose at some time to withdraw from the work force to meet family responsibilities; the second is that work skills depreciate during such withdrawals. If these assumptions hold, women might choose to defer investments in their future - such as on-the-job training - until after all their expected withdrawals have been completed. This might make the first few years of work less crucial for women than for men.

"Crowding" theorists argue that women tend to be segregated into "female" jobs and that these jobs provide few opportunities for on-the-job training. (Bergmann, 1971; Stevenson, 1973). This job segregation need not be involuntary. Polachek (1975) argues that some women will choose jobs where future movement in and out of the labor force will not be penalized. If women are disproportionately concentrated in jobs with few training opportunities, then delays in entering the labor market should have few permanent effects on women's careers since most women will not be missing out on valuable investment opportunities.

Even if we accept this reasoning, a number of factors may be operating to increase the harmful effects for women of not working in their early years. As women's participation in the labor force increases and fertility rates decrease, incentives to defer investment and/or to enter occupations which do not penalize them for frequent entries and exits should drop. This should also occur if younger women's perceptions of appropriate sex roles in the labor force and at home are less sex-stereotyped than those of previous generations. Similarly if equal opportunity and affirmative action policies are widening the range of jobs available to women, then early work behavior might become a more important determinant of women's economic life chances.

Using Panel data, empirical researchers have estimated measures of persistence in work participation of married women aged 30 to 50 years, which allow for individual differences (Heckman and Willis, 1977; Heckman 1978b, d; Chamberlain, 1978c.). Cross-sectional analyses of wage determination suggest that periods of nonwork are associated with lower wages for married women aged 30 to 50 years (Mincer and Polachek, 1974; Corcoran 1979). But analysts have not made such a thorough investigation of the determinants and consequences of teenage nonemployment, particularly among teenage women. Yet economic theories suggest that the teenage years may be important decision years and that decisions about family and work are interrelated. Suppose, for instance, young women respond to a lack of decent jobs by getting married, bearing a child or by staying home to raise a child; these decisions will in turn shape future work decisions.

DATA AND SAMPLES

I examined the employment consequences of early nonwork for teenage girls using subsamples of the National Longtitudinal Survey (NLS) of Young Women. This is a national sample of 5159 young women between the ages of 14 and 24 who were interviewed annually from 1968 to 1973, and then were interviewed again in 1975. Each year women reported on the past year's labor market experiences. I used this data to track employment experiences for a cohort of young women who left school in 1966, 1967, 1968 and remained out of school for at least four consecutive years. Women still in school were eliminated from analysis since nonwork during school may be less likely to have permanent effects on later employment or wages. Analysis is restricted to women with less than 14 years of schooling in order to avoid confounding the effects of age and education. The group of women aged 15-19 years who are out of school includes dropouts and high school graduates, while a group of women aged 20 to 24 years and out of school includes college graduates with little experience and high school dropouts with as much as eight years of experience. There is a potential selection bias here since education is a powerful predictor of women's labor supply. Finally by only including women who reported their work behavior in each of the four years following school the sample was reduced from 829 to 634 women. This may cause some selection bias problem since the 634 women who reported on their work behavior were apparently more likely to be employed and less likely to be out of the labor force (See Table 1).

Thus my major sample consists of those 634 young women in the NLS who left school permanently in 1966, 1967, or 1968 with less than 14 years of education and who reported on their work behavior in each of the next four full years. Parallel analyses are also reported for those 401 women in this group who reported work behavior over five full years.

The NLS data show higher employment rates and lower unemployment rates than do the CPS data (See Ellwood and Meyer and Wise). Part of this difference probably reflects differences in respondents; in the NLS, the teenager reports on her work status; in the CPS, a parent reports on their child's work status. Freeman and Medoff ~~(Chapter YY in this volume)~~ show that if we compare reports of parents and teenagers in the same family, the teenagers' reports show more employment and less unemployment than do the parents' reports. However, part of the difference in NLS and CPS statistics could occur because the long-term unemployed are less likely to participate in or remain in longitudinal surveys.[2]

Both the sample selection procedures and the CPS comparison suggest that some women with long-term records of nonwork may be omitted from our sample of 634 women. Analysis performed on this sample may underestimate the long-run costs associated with nonemployment in the teenage years.

I. WOMEN'S EARLY EMPLOYMENT PATTERNS

Women's employment and labor force participation declined steadily in the

Table 1

EFFECTS OF ADJUSTMENTS FOR MISSING DATA
(For women who left school in 1966, 1967 or 1968 who had less than 14 years of schooling)

	Respondents Who Reported Their Labor Force Status in Years 1 to 4 at the Time of the Interview[a]			Respondents Who Reported Their Past Year's Work History for Years 1 to 4 After School Completion		
Year	Percent Employed	Percent Unemployed	Percent out of the Labor Force	Percent Employed	Percent Unemployed	Percent out of the Labor Force
1	58.5	8.3	33.2	65.0	8.2	26.8
2	56.6	8.2	35.3	63.1	7.7	29.1
3	56.6	6.5	36.9	63.1	6.1	30.8
4	52.4	6.1	41.5	57.7	6.1	36.2
N	770	770	770	634	634	634

[a] There are 829 women in the Parnes who left school in 1966, 1967 or 1968 and who had less than 14 years of school; 770 of these women reported their labor force status at the time of the interview in the next four years.

first four years out of school. Women's participation and employment rates dropped from 68 and 64 percent in the first year to 60 and 57 percent by the fourth year. (Table 2) This is in marked contrast to young men whose employment and participation rates rose steadily over the same period to 90 and 95 percent by the fourth year. (See Ellwood, Table 1) The decreases in women's participation and employment rates were the result of increases in the amount of time women stayed out when they were employed. The average time spent out of the labor force by those with any such time increased from 27 to 34 weeks over the period, and the proportion of women who did not work at all in a given year almost doubled from 12 percent in the first year to 24 percent in the fourth year.

The diversity and change apparent in teenage women's labor force patterns is striking. Women move continually between work and nonwork in the four years following school. Almost all women spend some time not employed (90 percent) and some time employed (96 percent) over this period. Even in a single year, at least three out of four women reported some work and six out of ten reported a period of nonwork (table 3).

Tracking the unemployment rate over time provides little information about changes in women's labor force activities. Although employment and participation rates decreased in the four years following school completion, there was no clear time trend in unemployment rates. Moreover, time unemployed formed less than one-seventh of women's total nonemployment time.

Women clearly spend a great deal of time not working in the years following school completion. Almost one-quarter of all women did not work at all in the fourth year following school and, in any given year more than two-thirds reported some nonwork time. In addition, nonwork time per person out of work increased from an average of 27.4 weeks in the first year after school

Table 2

Unemployment Rate, Employment Rate and Labor Force Participation Rate for Young Women During First Five Years[a] After Leaving School in 1966, 1967, or 1968 with Less than 14 Years of Schooling

	Unemployment Rate*	Employment Rate**	Labor Force Participation Rate***
Year 1[b]	5.8	63.9	67.8
Year 2[b]	4.8	62.9	66.0
Year 3[b]	5.6	60.5	64.1
Year 4[b]	5.4	56.8	60.0
Year 5[c]	3.6	58.1	60.3

[a] A year here is not a single calendar year. Instead, the n'th year represents the n'th full year following school completion. Thus for women who left school in 1966, year 1 is 1967; while for women who left school in 1968, year 1 is 1969.

[b] N=634

[c] N=401

*Average weeks unemployed/average weeks in labor force
**Average weeks employed/52
***Average weeks in labor force/52

Table 3

Percent of Women with Unemployment Time, Time Out of Labor Force, and Time not Employed, and Who Never Worked During the First Four Years After Leaving School

	Percent Unemployed	Percent with Time Out of Labor Force	Percent with Time Not Employed	Percent Who Never Worked in Year t
Year 1	25.6	62.1	68.5	11.8
Year 2	22.0	61.5	66.3	17.2
Year 3	22.8	61.8	68.2	20.4
Year 4	18.2	62.6	66.7	23.9

N=634

to an average of 32.3 in the fourth year. Given that the procedures for dealing with missing data and that NLS/CPS comparisons suggest that these data are likely to underrepresent nonwork time, these results are quite dramatic. Understanding the extent to which this nonwork time hinders women's future economic life chances is the central issue of this paper.

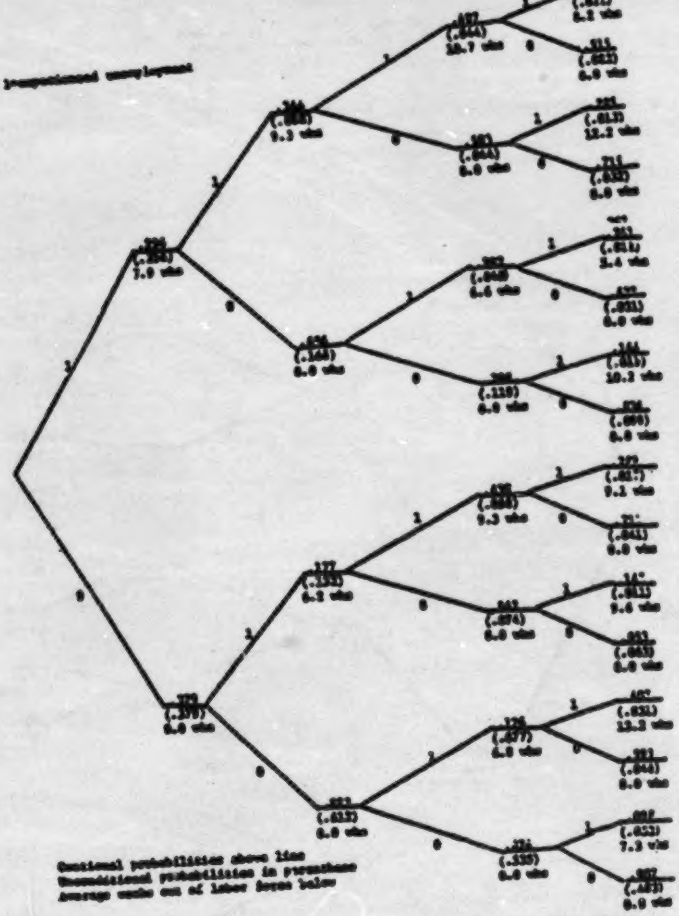
The Persistence of Labor Market Experiences

Early labor market experiences predict later ones. This section documents the extent of this persistence in work experience. The next section will investigate whether or not this persistence is due to personal differences in worker characteristics or to a causal link between past and current employment.

Figures 1, 2, 3 and 4 are probability trees for unemployment, time out of the labor force, time not employed, and whether never employed over the four year period. Each branch corresponds to one year. A "1" indicates that a woman was unemployed, spent time out-of-the labor force, was not employed or was never employed in that year; a "0" indicates the opposite. Above the line at a branch is the estimated probability of being in that state given you were at the previous branch. Below the line in parentheses is the proportion of all people who are found on that branch. The bottom number under a branch is the length of time spent in a particular state. Thus in Figure 1, 34.4 percent of women who were unemployed in their first year were also unemployed in the second year; 8.8 percent of all women were unemployed in both years and these women averaged 9.3 weeks out of work.

There is considerable persistence in young women's labor market experiences. For instance, the estimated probability that a woman did not work at all in year two is .608 if she did not work in the previous year and .116 if she worked (See Figure 4). By the fourth year after school completion, women who had never worked were eight times

Probability Tree of Weeks Unemployed in First
Four Full Years Out of School
n=634

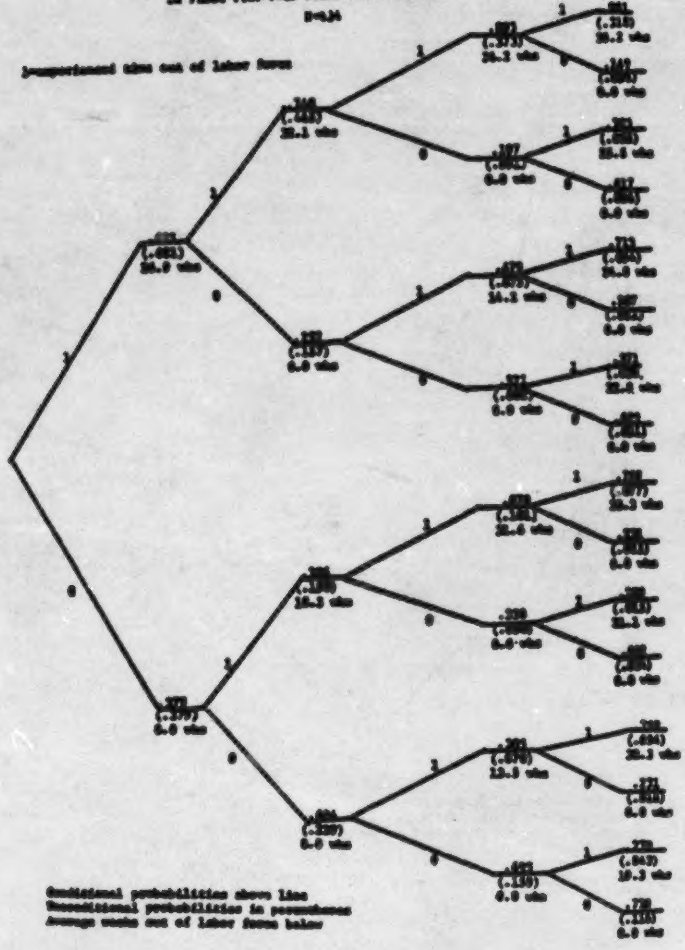

1=experienced unemployment

Conditional probabilities above line
Unconditional probabilities in parentheses
Average weeks out of labor force below

Figure 2

Probability Tree of Weeks out of the Labor Force
in First Four Full Years out of School

N=434



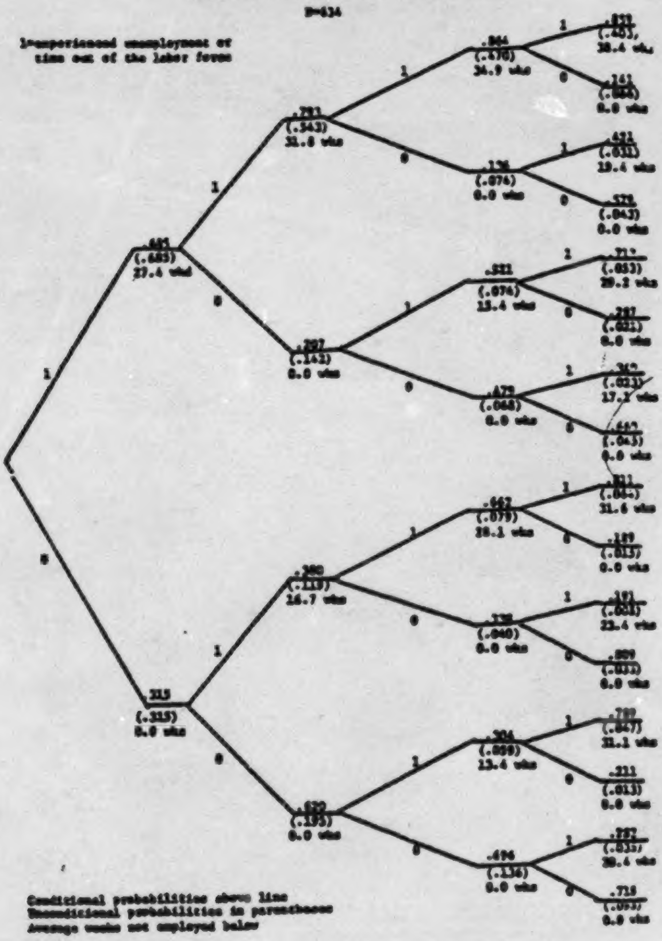
1=experienced time out of labor force

Conditional probabilities above line
Unconditional probabilities in parentheses
Average weeks out of labor force below

Figure 3

Probability Tree of Weeks Not Employed in
First Four Full Years out of School

N=634



1
0
.685
(.685)
27.4 wks
.315
(.315)
0.0 wks
.791
(.543)
31.8 wks
.207
(.142)
0.0 wks
.380
(.119)
16.7 wks
.620
(.195)
0.0 wks
.864
(.470)
34.9 wks
.136
(.074)
0.0 wks
.521
(.074)
13.4 wks
.479
(.068)
0.0 wks
.662
(.079)
28.1 wks
.338
(.040)
0.0 wks
.304
(.059)
13.4 wks
.696
(.136)
0.0 wks
.859
(.403)
38.4 wks
.141
(.066)
0.0 wks
.421
(.031)
19.4 wks
.579
(.043)
0.0 wks
.717
(.053)
20.2 wks
.283
(.021)
0.0 wks
.343
(.023)
17.2 wks
.657
(.043)
0.0 wks
.811
(.064)
31.6 wks
.189
(.015)
0.0 wks
.191
(.008)
23.4 wks
.809
(.032)
0.0 wks
.789
(.047)
31.1 wks
.211
(.013)
0.0 wks
.287
(.039)
20.4 wks
.713
(.097)
0.0 wks

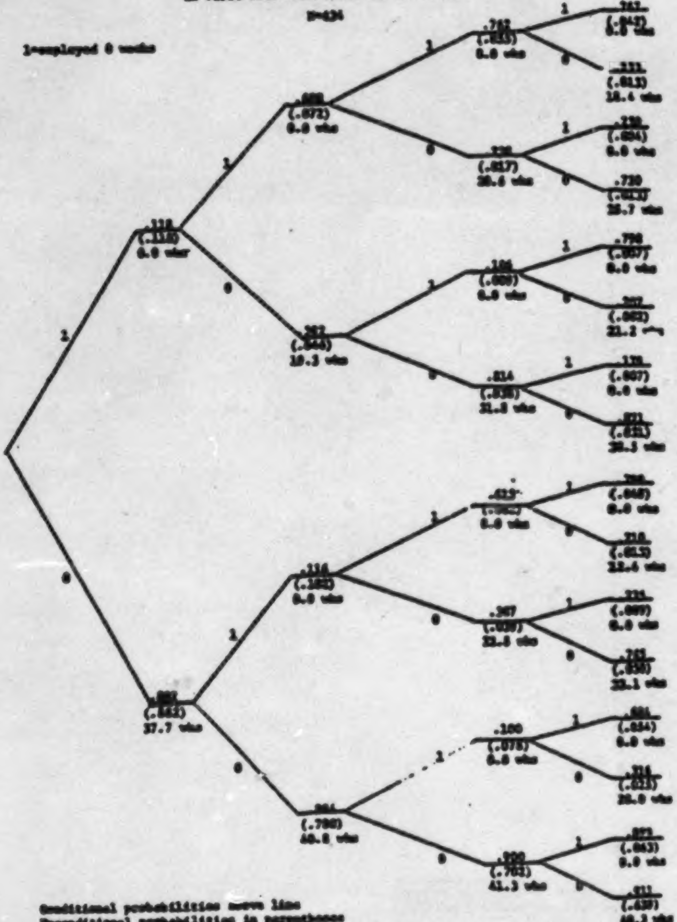
1=experienced unemployment or
time out of the labor force

Conditional probabilities above line
Unconditional probabilities in parentheses
Average weeks not employed below

Figure 4

Probability Tree of Zero Weeks Employed in First Four Full Years out of School

N=434


1=employed 0 weeks
1
0
(.072)
0.0 wks
(.017)
20.6 wks
(.024)
0.0 wks
.730
25.7 wks
19.3 wks
(.007)
0.0 wks
21.2 wks
.214
21.3 wks
(.007)
30.3 wks
0.0 wks
(.048)
22.6 wks
.367
(.009)
22.5 wks
33.1 wks
37.7 wks
.100
(.078)
0.0 wks
(.024)
26.0 wks
(.780)
40.8 wks
(.702)
41.3 wks
(.063)
(.639)
40.3 wks

Conditional probabilities above line
Unconditional probabilities in parentheses
Average weeks employed below

as likely not to work as were women who had worked in each of the previous years (.767 to .089).

But, such patterns can be misleading (See Ellwood). If spells of unemployment are long, say 13 weeks, and are distributed randomly throughout the -year, then one-quarter of all the unemployed in one year would have spells which overlap into the next one. Table 4 gives the estimated probabilities of being unemployed, out of the labor force, not employed, or never working in the third, fourth and fifth years, given one's work experiences in year one. Again, labor market behavior persists. Women who spent some time not employed in the first year were 1 1/2 times as likely to miss some work in the fifth year as were women who had worked continuously in the first year. And, women who did not work at all in year one were 1.8 times as likely not to work at all in the fifth year as were women who had worked in the first year.

Cross-year correlations for weeks not employed in the first four and five years following school completion also indicate that employment behavior persists (See Table 5). Estimates of the one-year correlation range from .6 to .7 and the correlation between the first and fifth years is .26. Persistence in weeks not employed is stronger for young women than for young men (Ellwood). There is also a slight tendency for correlations to increase over time.

Women's weeks unemployed show far less persistence. Adjacent year correlations range from .12 to .35 and drop quickly. The correlations between weeks unemployed one year removed range from .05 to .21.

The cross-year correlations for weeks not employed are more stable than would be generated by a first order Markov process. Individual differences could be an important part of the underlying process. The next section of this paper investigates whether persistence in employment merely reflects differences in workers' traits or whether furture employment is causally

Table 4

Probability of Unemployment, Time Out of Labor Force, Time Not Employed and Never Working in Later Years Conditional on First Full Year Out of School

	Unemployment	Time Off	Time Not Employed	Never Working
P(1 in year 2/1 in year 1)[a]	.344	.748	.786	.608
P(1 in year 2/0 in year 1)[a]	.177	.396	.370	.116
P(1 in year 3/1 in year 1)[a]	.362	.721	.793	.542
P(1 in year 3/0 in year 1)[a]	.182	.449	.440	.159
P(1 in year 4/1 in year 1)[a]	.278	.702	.744	.508
P(1 in year 4/0 in year 1)[a]	.150	.499	.499	.198
P(1 in year 5/1 in year 1)[b]	.242	.719	.758	.408
P(1 in year 5/0 in year 1)[b]	.187	.519	.485	.221

[a] N=634

[b] N=401

Table 5

Correlation Matrix for Weeks Not Working During First Five Years Out of School N=401

Weeks Not Working	Weeks Not Working Year 1	Year 2	Year 3	Year 4	Year 5
Year 1	1.00	.57	.46	.32	.26
Year 2		1.00	.67	.49	.45
Year 3			1.00	.67	.54
Year 4				1.00	.74
Year 5					1.00

Weeks Unemployed	Weeks Unemployed Year 1	Year 2	Year 3	Year 4	Year 5
Year 1	1.00	.35	.05	.11	.00
Year 2		1.00	.15	.15	.03
Year 3			1.00	.12	.21
Year 4				1.00	.29
Year 5					1.00

related to past experience.

II. SOURCES OF PERSISTENCE IN YOUNG WOMEN'S EMPLOYMENT DECISIONS

Past and current employment decisions show a positive and strong association, but several quite different processes could generate this association. It could be seen as a "mover-stayer" problem; unobserved differences in women's talents, motivations or preferences--"heterogeneity"--might be correlated with their past and present employment behavior (Heckman and Willis, 1977). A second possibility is that women's past and present work behavior is affected by unobserved variables which are serially correlated over time. For instance, a woman may not work in two adjacent years because the local market is depressed both years. Finally early work (or nonwork) may have a "real" effect on later work behavior--"state dependence." This could arise for several reasons. Women's preferences for market or home work may be altered as a result of early employment (or home production) activities; i.e., working may reinforce the desire to work. Similarly women's work skills and hence their ability to find employment and/or demand high wages may grow as a result of employment (through investment in on-the-job training, accumulation of seniority, etc.) and depreciate during periods of nonwork (See Mincer and Polachek).. Finally, even if worker skills and motivations are unaltered by early nonwork or employment experiences, employers may use past behavior as an indicator of future behavior when hiring.

Distinguishing heterogeneity from serial correlation and state dependence is not straightforward. Economists have routinely dealt with heterogeneity by assuming it away--i.e., by assuming that unmeasured tastes, preferences and/or talents are uncorrelated with included independent variables (in this case with past work behavior). The ways in which panel data are collected further complicates this task. Apparent persistence in employment behavior over time could occur simply because a single employment spell spans two data collection periods.

Heterogeneity vs. State Dependence-Some Econometric Models

Heckman (1978b, 1978d) and Chamberlain (1978c) have developed models to explore persistence in behavior over time. I will use Chamberlain's autoregressive logistic model to investigate the extent to which a woman's work history influences her current work behavior. This model eliminates effects of unobserved person factors by comparing the likelihood that a woman works given she worked in the previous year to the likelihood that the same woman works given she did not work in the previous year.

The model is:

$$\text{(equation 1)}\ \text{Prob}(y_{it} = 1 | y_{i,t-1}) = \frac{\exp(\alpha_i + \gamma y_{i,t-1}}{1+\exp(\alpha_i + \gamma y_{i,t-1})} \qquad \begin{array}{l} i = 1,\ldots N \\ t = 1,\ldots T \end{array}$$

y_{it} = 1 if person i is employed anytime in period t
= 0 otherwise

α_i = unobserved personal characteristics which raise the i^{th} person's propensity to work $i = 1 \ldots N$

In this model, the conditional probability that the i^{th} woman works this year, given her last year's employment status depends on an individual-specific constant (α_i) and on her employment status in the previous year. This model has N + 1 unknowns: N individual-specific constants (α_i) and γ, the coefficient on last year's employment status. If unmeasured person effects (α_i) completely accounted for the observed association between past and present employment behavior then γ should equal "0". We can test this by calculating a confidence interval for γ.

Note three characteristics of this model. First, the individual traits which influence a woman's probability of work (α_i) do not vary over the time period considered (in this case over the five years following school completion). Second, this model assumes that γ is constant over the time period considered; that is, the relationship between employment in two adjacent years does not change over time. Taken together these two assumptions imply that the distributions of transitional employment probabilities should be similar across time. We can check this by seeing whether the estimated conditional employment probabilities change much over the five-year period. The estimated mean values of $p(1|0)$, the probability of working this year given one did not work last year, were quite similar across the five-year period ranging from .106 to .120. But estimated values of $P(1|1)$, the conditional probability of employment this year given employment last year, increase over the five year period from .549 in years 1 and 2 to .680 in years 4 and 5. This suggests that there may be a time trend in employment behavior. Third, there are no X's (exogenous predictors) in this model. Constant X's will be captured in α_i, but the model cannot capture effects of changing X's. This means that we cannot differentiate serial correlation from state dependence with this model. In practice, this may not be such a serious limitation. I attempted to predict women's employment decisions using a number of demographic and demand variables which changed over time.[3] Only one of these consistently and significantly influenced women's probability of employment, "number of dependents." But if lack of early work reduces the probability of later work by increasing women's incentives to bear and raise children, then we should not control for family size when estimating state dependence.

If we allow each individual to have their own individual specific parameter (α_i), maximizing the joint likelihood function over α_i and γ will not in general provide a consistent estimator of γ. But Chamberlain shows that we can get a consistent estimator of γ if we use a conditional likelihood function. The basic idea is that the number of years a women was employed over the period, $s_i = \sum_{t=1}^{T} (y_{it})$ and her employment status in the last year (y_{iT}) provide sufficient statistics for the omitted person factor, (α_i). Holding fixed s_i and y_{iT}, α_i drops from the likelihood function. Initial conditions are dealt with by conditioning on a woman's employment status in the first full year following school completion (y_{i1}).[4] This gives:

$$\mathrm{Prob}(y_{i1}, \ldots, y_{iT} \mid y_{i1}, \sum_{t=1}^{T} y_{it}, y_{iT}) = \frac{\exp(\gamma \sum_{t=2}^{T} y_{it} y_{it-1})}{\sum_{d \in B_i} \exp(\gamma \sum_{t=2}^{T} d_t \, d_{t-1})}$$

where $B_i = \{\underset{\sim}{d} = (d_1, \ldots, d_T) \mid d_t = 0 \text{ or } 1,\ d_1 = y_{i1},\ \sum_t d_t = \sum_t y_{it},\ d_T = y_{iT}\}$

Here, $S_{i11} = \sum_{t=2}^{T} y_{it} y_{i,t-1}$ is a sufficient statistic for γ.

For $T \geq 4$, there are conditional probabilities that depend upon γ. Since not all conditional probabilities will depend upon γ, this procedure uses only a subset of any given sample to estimate γ. For instance, when $T=5$, 18 of the 31 possible sequences depend upon γ. (See Chamberlain, 1978c for a more detailed discussion of this model.)

Even if γ were significantly different from zero we still cannot conclude that a woman's past work behavior is causally related to her current work behavior. Such persistence could also be due to unmeasured factors which influenced her chances of working and which were serially correlated over time (e.g., local demand conditions).[5] In addition, the measure γ depends upon the period of observation. Even if women's past and current behavior were not causally related, we would expect γ to be non-zero simply because a nonemployment spell may span two years. To see this, suppose our period of observation was one day; the probability that a person who worked yesterday will work today will be very close to one.

To completely describe a woman's work history we would want to know the length and timing of all spells of work and nonwork. If her past work history did not help us to predict her future, given her current state then this is a Markov process. Chamberlain (1978c) calls deviations from the Markov property "duration dependence". He points out that duration independence would imply that a woman's employment history prior to the current spell should not affect the distribution of the length of the current spell; and the amount of time spent in the current spell should not affect the distribution of remaining time in that spell. This implies that the duration of the spells should be independent of each other and the distribution of time in a state should be exponential. If we assumed that all spells of employment have the same distribution, that all spells of nonwork have the same distribution and that the exponential rate parameter for each of the states is the same for all spells, then we would have an alternating Poisson process. In this case, the stationary heterogeneity model implies that each woman is characterized by the two parameters of an alternating Poisson process. Departure from this model would be evidence of duration dependence at the individual level; i.e., even given her current state, a woman's past history helps predict her future.[6]

Chamberlain has developed tests for duration dependence based on binary employment sequences generated by questions like "Did you work last year"? The basic idea underlying these tests is that stationary heterogeneity implies that a woman's probability of working in period t depends upon the number of consecutive periods immediately preceding period t in which that woman worked. The reasoning goes as follows. If a woman is following an alternating Poisson process then only her state at the end of the past year is relevant. If $y_{t-1} = 1$, we know only that she worked sometime last year. We do not know whether she worked at the end of the past year, and y_{t-2} will affect the probability that she worked early in the year rather than late in the year. But if $y_{t-1} = 0$, then the woman never worked last year. Thus, we know her state at the end of that year and y_{t-2}, y_{t-3}, ... are irrelevant. This gives

$$\text{Prob}(y_t = I|y_{t-1}, y_{t-2}, \ldots) = \text{Prob}(y_t = 1|y_{t-1} = \ldots = y_{t-J} = 1,$$
$$y_{t,J-1} = 0) = \text{Prob}(y_t = 1|J),$$

where J = the number of consecutive preceding years that the woman was employed.

That is, the probability that a woman works n year t depends only on how many consecutive years she worked immediately preceding year t. This would give the following logistic model:

$$\text{Prob}(y_{it} = 1|y_{i,t-1}, y_{i,t-2}, \ldots) = \frac{e^{A_i}}{1+e^{A_i}},$$

where $$A_i = \alpha_i + \sum_{k=1}^{\infty} \psi_{ik} \prod_{j=1}^{k} y_{i,t-j}$$

Here, each woman has her own set of parameters α_i and Ψ_{ik}. Chamberlain extends this model to test for duration dependence as follows.

(equation 2)
$$\text{Prob}(y_{it} = 1|y_{i,t-1}, y_{i,t-2}, \ldots) = \frac{\exp(A_i + \gamma_2\, y_{i,t-2})}{1 + \exp(A_i + \gamma_2\, y_{i,t-2})}$$

For $T \geq 6$ and large N, we can consistently estimate γ_2 using a conditional likelihood function. For T=5, Chamberlain's model has some equality predictions for particular sets of conditional probabilities which enable us to tell whether or not γ_2 significantly differs from zero.

Empirical Results: Employment Effects of Early Nonwork

The techniques described in the previous section were used to analyze the persistence of employment. I looked at employment behavior rather than participation behavior because results of other studies (Ashenfelter, Summers and Clark) suggest that for young women time unemployed and time out of the labor force are not conceptually distinct.

I began by obtaining an estimate of first-order dependence that is based on Chamberlain's autoregressive logistic model, where each woman is assigned her own employment probability (equation 1). Using Chamberlain's conditional likelihood function on five year employment sequences, gives $\hat{\gamma}=2.05$ with a standard error of .33. This estimate is based on the employment sequences of 80 women (19.9 percent of the five year sample).[7]

A woman's employment behavior in one year is a good predictor of her employment behavior in the next year--even after we allow each woman to have her own employment probability. The odds that the same woman works, given she worked in the previous year are $e^{2.05} = 7.8$ times higher than if she did not work last year. While high, these odds are only about half as large as the odds we would get if we ignored heterogeneity. Not allowing for unobserved person factors would increase these odds to 14.8.[8]

This estimate of adjacent year persistence in work behavior $(\hat{\gamma})$ assumes stationary heterogeneity, invariance of γ over time and does not control for changing X's. Yet the estimates of $P(1|1)$, the conditional probability of a woman being employed this year if she was employed last year, rose considerably in the five year period following school from .549 for years one and two to .680 for years four and five. This suggests employment transition probabilities may be increasing over time. Our estimate of persistence may pick up some of this time trend.

The following model suggested by Chamberlain (1979) allows us to include a time trend:

$$p(y_{it}=1|y_{i,t-1}) = \frac{\exp(\alpha_i + \beta X_t)}{1+\exp(\alpha_i+\beta X_t)} + \gamma y_{i,t-1}$$

where $X_t = t-1 \quad t = 1, \ldots T$

Here the term "βX_t" allows us to pick up a time trend. Consistent estimates of $\hat{\beta}$ can be obtained using a conditional likelihood function. By comparing the value of γ that obtains when we set $\beta=0$ to the value of γ that obtains when β is estimated we can get a rough idea of how much our estimate of adjacent-year persistence will drop if we allow for a time trend.

Not allowing for a time trend (i.e., setting $\beta=0$) gives $\hat{\gamma}= .47$, this estimate is significant ($p< .05$). Not allowing for state dependence (setting $\gamma=0$), gives $\hat{\beta}= .30$, this estimate is not very significant ($p=.25$). If we estimate both β and γ, the estimate of γ is still large, $\hat{\gamma}=.31$, but is not very significant ($p=.25$); the estimate of β is quite small, $\hat{\beta}= .09$ and is quite insignificant ($p=.86$). Thus allowing for a time trend reduces estimates of adjacent year persistence ($\hat{\gamma}$) by about one-third.[9]

The NLS data did not provide strong predictors of the work decision which also changed over time and which were not proxies for expectations. I tried area demand variables (whether South, whether lived in a city and the local unemployment rate) and a measure of husband's income as predictors of the decision to work in the second, third, fourth, and fifth years following school completion. None of these consistently and significantly predicted the decision to work. Given this I did not attempt to differentiate between serial correlation and state dependence on these analyses.

Recall, that we would expect to observe some persistence in women's work behavior simply because of the way in which the NLS employment information is recorded. That is, past and current employment will be associated simply because a single work (or nonwork) spell may span two years. Instead of asking whether a woman's previous year's employment status helps to predict her current year's employment status we may want to ask whether given her current employment status, her employment history enables us to predict her future. That is, does employment behavior follow a Markov process? Departures from this Markov property are evidence of duration dependence, i.e., evidence that given a woman's current employment status, her past employment history is informative about her future.

I tested for departures from this Markov property using Chamberlain's second - order autoregressive logistic model (equation 2). Chamberlain has shown that when T=5, probabilities of certain binary employment sequences should be equally likely whenever there is no duration dependence. A likelihood ratio test comparing those probabilities which obtain under the assumption of no duration dependence ($\gamma_2 = 0$) to the probabilities in the data (unrestricted model) gives $\chi^2(5)=10.9$, based on 30 women. This is significant at the .05 level, suggesting a departure from an alternating Poisson process. That is, we can not conclude that given a woman's current state, her past work history will not influence her future.

Taken together, these results strongly reject the notion that unexplained personal differences entirely account for the strong link between women's present and past employment behavior. The odds that a woman works given she worked last year are 7.8 times higher than if she did not work last year—even if we allow each woman to have her own employment probability. Further, even after we adjust for data collection procedures, there is still a link between past and current employment. Given a woman's current employment status, her past work history still predicts her future. This finding was significant even though based on only a small number of cases.

Given the small number of cases I could not estimate the magnitude of this duration dependence, nor could I estimate how quickly the predictive power of early employment dies out over time. Finally, it may be that women who do not work early in their careers "catch-up" by working more later. Because of data restrictions I do not investigate this possibility.

These findings are not inconsistent with those reported by Ellwood and by Meyer and Wise. We both find employment behavior persists in the short run. Ellwood and Meyer and Wise further show that these employment effects diminish after several years; because of data restriction I did not investigate this for women.

III. LONG-RUN WAGE LOSSES ASSOCIATED WITH EARLY NONWORK

The previous section documents and explores the persistence of employment in the short-run. In the long run lost wages may be a more serious cost of early nonemployment. Losing early work experience may impose costs in addition to delaying the start of a career. If employers evaluate a worker's potential by her past work behavior, women who spent considerable time out of work in the years following school completion may be permanently tracked into less desirable career ladders. If working (or not working) reinforces the tendency to work (or not to work) and/or if human capital depreciates during periods of nonwork, then women's expected lifetime earnings may be permanently lowered by extended periods of nonwork in their early careers. Even if much of the wage loss were "voluntary" (in the sense that women trade off wages for flexibility, and/or time to engage in home work), it would still be useful to know the "opportunity costs" associated with early nonemployment.

I explore the longrun opportunity costs of early nonwork using a sample of 2067 employed women aged 18 to 64 years (1326 whites and 741 blacks) from the 1976 wave of the Panel Study of Income Dynamics (PSID). In 1975, these women reported about their wages and current jobs and gave retrospective reports of their employment histories. Using this data, I constructed the experience and non-work measures. (Elsewhere, Corcoran, 1979, I describe in detail how these measures were constructed). Note that these measures differentiate nonwork "which occurs early in a woman's career", "number of years not employed in the period following school completion", from nonwork which "occurs later in a woman's career, "other nonwork time." A large percentage of these women (29 percent of the whites and 42 percent of the blacks) experienced a year or more of nonwork early in their careers. And this nonwork was often quite extensive; the average duration was 9.6 years for white women and 7.2 years for black women.

This analysis involves 7 pairs of equations. First I regress the natural logarithm of wages on experience and nonwork measures with controls for education, city size and region for employed black and white women (Table 6, columns 1 and 2). Some economists (Heckman, 1974; Gronau, 1974) have argued that restricting analysis to employed women could lead to selection bias if the independent variables in the wage equation influence a woman's market wage relative to her reservation wage. So next I reestimate the wage equation using a procedure described by Heckman (1977) which corrects parameter estimates for selection bias[10] (Table 6, columns 3 and 4). This is followed by a modest attempt to control for heterogeneity by adjusting for individual differences in women' labor force attachment. The PSID provides four indicators of labor force attachment: absenteeism due to own illness; absenteeism due to others' illness; self-imposed restrictions on work hours and/or job location and whether the respondent plans to leave work in the near future for reasons other than training. If women with less experience earn less than other women because low attachment to the labor force both decreases wages and leads to less work,[11] then controlling for attachment should reduce the observed effect of work and nonwork measures on wages. Table 6, columns 5 and 6 present the results when these four indicators of attachment are added to the regression of experience and nonwork measures on wages. But to the extent that these measures of labor force attachment are subject to random measurement errors, use of OLS may still understate the influence of attachment on wages (Griliches, and Mason, 1973), and hence overstate the influence of experience and nonwork. To correct for this problem I use a two-stage procedure to get predicted values of the labor force attachment measures, Table 6, columns 7 and 8.

Finally, work experience is not obviously an exogenous variable since a woman's expected market wage will presumably influence her decision to work. Table 7 compares results of three sets of equations. In the first (columns 1 and 2), experience is assumed exogenous; in the second (columns 3 and 4), experience is assumed to be endogenous; and in the third experience is assumed endogenous[12] and corrections are made for selection bias.

Results were consistent across all sets of equations. Both black and white women's wages increased with experience; this increase was large for the first few years and then dropped off over time. In addition not working for prolonged periods early in one's career lowered white women's expected wages by .7 percent for each of the nonworking years in addition to lowering wages indirectly by lowering total experience.[13] None of the observed influences of early nonwork and experience on wages were reduced when I adjusted for selection

Table 6

Work Experience, Early Non-work and Wages for Employed Women Aged 18-64 Who Were Wives or Heads of Households in 1975

(N=1326 Whites[a], 741 Blacks)

Dependent Variable = Ln (1975 hourly wage)

PREDICTOR VARIABLES	White	Black	White	Black	White	Black	White	Black
Education	.0855** (.0053)	.0921** (.0070)	.0839** (.0055)	.0902** (.0073)	.0842** (.0054)	.0920** (.0073)	.0831** (.0057)	.0730** (.0091)
Total Work Experience	.0290* (.0045)	.0251* (.0053)	.0300* (.0054)	.0284* (.0054)	.0296* (.0046)	.0242* (.0052)	.0363* (.0055)	.0264* (.0069)
Total Work Experience Squared	-.0005* (.0001)	-.0005* (.0001)	-.0006* (.0001)	-.0006* (.0001)	-.0006* (.0001)	-.0005* (.0001)	-.0007* (.0001)	-.0006* (.0001)
Number of Years Not Employed in the Period Following School Completion[b]	-.0067* (.0023)	.0016 (.0029)	-.0073* (.0030)	-.0018 (.0030)	-.0066* (.0023)	.0027 (.0030)	-.0072* (.0025)	.0018 (.0032)
Other Non-Work Time[b]	-	-	-	-	-	-	-	-
City Size	-	-	-	-	-	-	-	-
South	-	-	-	-	-	-	-	-
Percent of Work Experience that was Full-Time[b]	-	-	-	-	-	-	-	-
Labor Force Attachment Measures								
Self-Imposed Limits On Job Hours or Location[c]					-	-	-	-
Days Absent in 1975 Due to Own Illness[d]					-	-	-	-
Days Absent in 1975 for Care for Others[d]					-	-	-	-
Expect to leave work in Near Future for Non-Training reasons[b]					-	-	-	-
Corrections for censoring[e]								
Labor Force Attachment Measures are Instrumented[f]							-	-

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-Means this variable was included

[a] A white is defined as a non-black

[b] See Corcoran (1979) for details on how these measures were constructed.

[c] See Hill (1979) for details on how these measures were constructed.

[d] See Coe (1979) for details on how these measures were constructed.

[e] This was done by estimating a probit analysis of the decision to work for all PSID women using the work experience, and nonwork measures, education, city size, region, family income exclusive of the respondent's earnings, marital status and the number of children less than 3 years, 3-6 years, 7-11 years, and 12-17 years. I used this equation to construct the Mills ratio and included it in my regression. See Heckman (1977) for a detailed description of this procedure.

[f] I instrumented the labor force attachment variables using a two-stage least squares routine. Instruments included the # and ages of children, marital status, family income exclusive of respondent's earnings, whether expect more children, own health problems, whether anyone in the family needed extra care, and fertility plans.

*Significant at .05 level

Table 7

Work Experiences and Wages—Corrections for Endogeneity
(for employed women aged 18-64 who were wives or heads of household in 1975)
(N=1326 Whites,[a] 741 Blacks)

	Dependent Variable=Ln (1975 hourly wage)					
Work Experience Measures[b]	White	Black	White	Black	White	Black
Total work experience	.0271* (.0047)	.0236* (.0052)	.0292* (.0056)	.0217* (.0073)	.0301* (.0056)	.0360* (.0085)
Total work experience squared	-.0005* (.0001)	-.0055* (.0001)	-.0007* (.0002)	-.0006* (.0002)	-.0008* (.0002)	-.0010* (.0003)
Corrections for endogeneity of experiences[c]			-	-	-	-
Corrections for censoring[d]			-	-	-	-

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eans the procedure was followed.

[a] A white is defined as a non-black.

[b] Controls were included for education, city size and region.

[c] Experience as a fraction of time since leaving school was estimated as a function of education, family income exclusive of respondent's own earnings, marital status and number and ages of children. Expected experience was estimated to be the product of this fraction and time since leaving school.

[d] This was done by estimating a probit analysis of the decision to work for all PSID wives and female heads using instrumented experience, education, city size, region, marital status, number and ages of children, and family income exclusive of the respondent's own earnings. I used this equation to construct the Mills ratio and included it in the regression.

* Significant at .05 level.

bias. This is consistent with other research (Heckman, 1977a, Corcoran, 1979). Similarly, treating experience as endogenous did not reduce the estimated effects of experience or early nonwork on wages. The magnitude of these influences also remained unchanged when controls were added for labor force attachment. But, of course, these procedures provide very crude adjustments for unmeasured personal traits which influence early experience and wages so we may be overestimating the long-term wage costs that are causally associated with early nonwork.

Two kinds of opportunity costs are associated with early nonwork; foregone earnings and the reduction in later earnings which is associated with lower experience and extended nonwork. I estimated this latter cost by comparing the expected 1975 earnings of women who have worked continuously to those of otherwise similar women (in terms of education, age, race, residence and on our measures of labor force attachment) who did not work for a year or more in the period immediately following school completion. (See Table 8) Note that these estimated costs are for nonwork which occurs in the years following school completion.[14] These costs are quite large even many years later. Ten years after school completion a two-year period of nonwork lowers white women's expected wages by five percent and lowers black women's expected wages by three percent. Even twenty years later, a four-year spell of nonwork lowers white women's wages by 5.8 percent and lowers black women's expected wages by 2.5 percent.

It might be more useful to estimate the expected wage reductions associated with an early spell of 9.6 years of nonwork for white women and with one of 7.2 years of nonwork for black women (these are the average durations of early nonwork time for women with any such time). Twenty years after school completion, these expected wage reductions are 16.8 percent for white women

Table 8

Expected Percentage Wage Differences Between Women Who Worked Continously Since School Completion and Women Who Experienced a Spell of Nonwork in the Period Immediately Following School

White Women[a]

Length of Nonwork Spell (in Years)	Number of Years Since Leaving School (Maximum Potential Experience)				
	5	10	15	20	25
1	3.1	2.5	1.9	1.3	.7
2	6.3	5.1	3.9	2.7	1.5
4	13.0	10.6	8.2	5.8	3.4
8	-	23.2	18.4	13.6	8.8
12	-	-	30.5	23.3	16.1
16	-	-	-	34.9	25.3

[a] These figures are estimated using the coefficients in Table 6, Column 6. This gives the effects of experience when education, city size, region, part-time work, self-imposed limits on jobs hours or location, days absent to care for oneself or others, and expectations about leaving work are held fixed.

Black Women[b]

Table 9

Expected Percentage Wage Differences Between Black Women Who Worked Continuously Since School Completion and Black Women Who Experienced a Spell of Nonwork in the Period Immediately Following School

Length of Nonwork Spell (in Years)	Number of Years Since Leaving School				
	5	10	15	20	25
1	2.0	1.5	1.0	.5	0
2	4.0	3.0	2.0	1.0	0
4	0.5	6.5	4.5	2.5	.5
8		14.6	10.6	6.6	2.6
12			18.2	12.2	6.2
16				18.7	11.5

[b] These figures are estimated using the coefficients in Table 6, column 6. This gives the effects of experience when education, city size, region, part-time work, self-imposed limits on jobs hours or location, days absent to care for oneself or others, and expectations about leaving work are held fixed.

and 5.6 percent for black women.

Given differences in sample populations and in methodology, it is difficult to compare these wage costs with those estimated by Ellwood and by Meyer and Wise. Nonetheless, the consistency across studies is quite remarkable. These authors also found that early nonwork was associated with significantly lower wages later on. Their estimates of men's wage losses were larger than those estimated on this sample of women.[15]

The wage losses associated with not working in the years following school completion are large and persist over time. I suspect, however, that a part of the wage costs associated with lower experience and early nonwork could be due to unobserved factors (e.g., "ability"; propensity to work) which differ across women and which are correlated with both employment behavior and wages, and which are inadequately captured by the included labor force attachment measures. In addition, even if all the observed wage losses were causally related to early nonwork, women may be voluntarily electing to trade off these wage gains for other desired goals. Nonetheless, it is evident from these data that women miss a great deal of nonwork early in their careers and that this loss of work is associated with lower lifetime earnings. Women forego earnings by not working, and early nonwork is associated with lower hourly wages throughout most of a woman's career.

Summary and Conclusions

Young women moved continuously in and out of employment in the four years following school. Almost all the young women in this sample spent some time not employed over this period, and it appears that these women's labor force attachment weakened somewhat over this period.

Many of these young women were not employed for a prolonged period of time. Descriptive results showed evidence of considerable persistence in women's employment behavior. Further analysis suggested that a part of this persistence is due to unmeasured individual differences which influenced a woman's propensity to work. Nonetheless, even allowing each woman to have here own employment probability, the odds that a woman worked given that she worked last year were 7.8 times higher that if she did not work in the previous year. Since the NLS data did not provide good exogenous predictors of employment behavior, I could not test whether this persistence was due to a causal relationship between past and present employment or to exogenous variables which were serially correlated over time.

Part of this persistence could, of course, be caused by the way the NLS collects and records employment behavior. That is, we would observe some first-order serial correlation simply because a single employment spell may span two years. However, even given a woman's current employment status, her past work history is informative about her future. Due to the small sample size, I could not estimate the magnitude of this association.

Evidence also suggests that early nonemployment is associated with lower future wages--even as long as twenty years later. Moreover, for white women, the wage losses associated with prolonged nonwork are greatest when it occurs at the beginning of their careers. While part of these wage losses may result from individual differences which are correlated both with early nonwork and with wages, controls for a number of behavioral indicators of labor force attachment did not decrease the estimated long-run wage losses associated with early nonwork. Whether or not it is voluntary, not working for a prolonged period during the teenage years is associated with considerably lower wages later on.

Nonemployment is pervasive and prolonged among teenage women with less than fourteen years of schooling. It is associated with a lowered probability of employment in the short-run and with lower wages throughout women's work careers. Whether voluntary or not, early employment behavior apparently has lasting implications for women's future economic careers.

Footnotes

1. This paper uses a set of techniques developed by Gary Chamberlain to examine employment persistence. Chamberlain has been extremely generous with both time and advice. Chamberlain helped me plan an analysis strategy for examining employment persistence and provided useful assistance at every stage of the analysis. I am also grateful for discussions with Joan Brinser, Greg Duncan, David Ellwood, Elizabeth Phillips and David Wise.

2. This does not appear to be the case for the NLS 74 (See Meyer and Wise).

3. I did this by estimating whether a woman worked in the i^{th} year follow-school completion as a function of region, urban residence, local unemployment rate, husband's income, marital status and number of dependents with controls for age, race and schooling.

4. This affects the distribution of $\underset{\sim}{\alpha}$, but since we are conditioning on $\underset{\sim}{\alpha}$, no problems arise.

5. Theoretically we can distinguish serial correlation from "true" state dependence when we have strong predictors (X's) of employment behavior which change over time. If all the remaining persistence in women's work behavior (after adjusting for heterogeneity) were due to exogenous factors that were serially correlated over time, then a change in X should have its full effect on work behavior immediately with no damped response into the future. On the other hand, if past and present work behavior were causally related, then a change in X should affect the probability of working now and should alter the probability of working in the future because the initial change in work behavior will induce future changes. To test this we need to introduce current and lagged values of predictors (X's) into a model which predicts the current decision to work, which omits the lagged decision to work, and which adjusts for heterogeneity.

6. This paragraph is a brief summary of a more elaborate argument developed by Chamberlain (1978b, 1978c).

7. Applying Chamberlain's model to four-year employment sequences gives much the same results. The estimate of first order dependence is large and significant ($\hat{\gamma}$ -1.81 with a standard error of .41), again suggesting that past employment is associated with significantly higher chances of future employment, even after adjustments for heterogeneity.

8. We calculate these odds as follows. For each year after the first, calculate the probability that a woman works, given she worked in the previous year. The average of these probabilities over years 2..T is equal to the average value of $P(1|1)$. Similarly calculate the average value of $P(1|0)$. For five years, these average values are .890 and .354. The odds are: $e^{\gamma}=(.890|.110)\ (.646|.354)=14.8$. Here γ would equal 2.84.

9. Chamberlain, (1979), in response to a question about time trends, very generously developed this procedure and used the NLS four year sample as an example.

10. This procedure involves estimating a probit function of the decision to work for all women, employed and unemployed, calculating the Mills ratio for each employed woman using the probit estimates, and including this Mills ratio in the regression equation.

11. Note, that this test will not allow us to distinguish between two quite different hypotheses. The first is that both work behavior and wages are causally related to attachment, but not to one another. The second is that work behavior alters attachment which, in turn, influences wages.

12. In order to treat work experience as endogenous, I assumed that fertility was exogenous. As Cain (1976) points out, this assumption is difficult to justify.

13. It should be noted that this result is consistent with many different hypotheses. This penalty to early nonwork could be due to the depreciation of human capital, to stereotyping by employers on the basis of early work behavior; or to reinforcement of "good" work attitudes by work and "bad" work attitudes by nonwork; I will not attempt to differentiate among these competing hypotheses, although each has quite different implications for our understanding of the wage determination process for women. Instead my purpose is in a more limited--to assess the opportunity costs associated with early nonwork.

14. It might also be useful to ask the question "Are labor force withdrawals which occur in the period following school completian more costly than labor force withdrawals which occur after beginning a career?" This is true for white women, but not for black women (See Corcoran, 1979).

15. Ellwood attempted to remove heterogeneity from the relationship between experience and wages by differencing using the NLS data. To do this, he assumed that wages and experience were not simultaneously determined and that problems of selection bias could be ignored since almost all young men worked in both years 3 and 4. These assumptions become much more suspect if applied to women. Research on women's labor force participation typically assume[8] that wages influence time worked. In the NLS four-year subsample of women, about 30 percent of the women did not work either in year 3 or in year 4 and so do not have wage measures for one or both years. Given problems of simultaneity and selection bias, I chose not to examine heterogeneity with the NLS data.

References

Ashenfelter, Orley. 1978. What do teenage employment statistics measure? In Supplementary papers from the conference on youth unemployment: Its measurement and meaning. Washington, D.C. U.S. Department of Labor.

Bergmann, Barbara R. 1971. Occupational segregation, wages, and profits when employers discriminate by sex and race. College Park, MD.: Economics of discrimination project, University of Maryland. Mimeographed.

Cain, Glen G. 1976. The challenge of segmented labor market theories to orthodox theory: A survey. Journal of Economic Literature, XIV: 1215-1257.

Chamberlain, G. 1978a. Omitted variable bias in panel data: Estimating the returns to schooling. Annales de l'INSEE.

_________. 1978b. Analysis of covariance with qualitative data. Harvard University, mimeographed.

_________. 1978c. On the use of panel data. Harvard University, mimeographed.

_________. 1979. Unpublished communication on time trends in women's employment behavior.

Corcoran, Mary. 1979. Work experience, labor force withdrawals and women's wages. In Andrews, Gilroy and Lloyd, eds. Women in the Labor Market. Columbia University Press. forthcoming.

Grilliches, Zvi and Mason, Williams. 1973. Education, income and ability. In Goldberger and Duncan eds., Structural Equation Models in the Social Sciences. New York: Seminar press.

Gronau, R. 1974. Wage comparisons--a selectivity bias. Journal of Political Economy, 82, No. 6:1119-43.

Heckman, James A. 1977. Sample selection bias as a specification error. Unpublished paper, the University of Chicago.

_________. 1978a. A partial survey of recent research on the labor supply of women. American Economic Review, Papers and Proceedings. May:200-12.

_________. 1978b. Heterogeneity and State Dependence in Dynamic Models of labor supply. University of Chicago, mimeographed.

_________. 1978 . Statistical models for discrete panel data developed and applied to test the hypothesis of true state dependence against the hypothesis of spurious state dependence. Annales de l'INSEE.

_________. 1974. Shadow prices, market wages and labor supply. Econometrica 42:679-94.

Heckman, J. J., and Willis, R. 1977. A beta logistic model for analysis of sequential labor force participation by married women. Journal of Economy 85:27-58i (b)

Mincer, J. 1962. Labor force participation of married women: A study of labor supply. In Lewis, H. G. ed., Aspects of Labor Economics, Princeton University Press.

Mincer, J. and Polachek, S. 1974. Family investments in human capital: Earnings of women. In Schultz, T. W. ed., The Economics of the Family, Chicago: University of Chicago Press.

Polachek, S. 1975. Differences in expected post school investment as a determinant of market wage differentials, International Economic Review 16, No. 2, 451-70.

Stevenson, Mary. 1973. Women's wages and job segregation, Politics and Society, Fall:83-95.

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